710
Rev 5

LIBRARY
SEP 15 1987
National Marine Fisheries Service
2570 Dole Street
Honolulu, Hawaii

REVIEW OF THE STATE OF WORLD FISHERY RESOURCES

by

Marine Resources Service
Fishery Resources and Environment Division
Fisheries Department

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
Rome, 1987

PREPARATION OF THIS DOCUMENT

This document, using statistics up to 1984 and including some information for 1985, is the biennial review of the state of the world fish stocks prepared by the Fishery Resources and Environment Division for presentation to FAO's Committee on Fisheries (COFI), and given wide circulation to interested institutions. It has been prepared on the basis of literature available throughout the world, but individual references are not given as the resulting bibliography would be very extensive.

ABSTRACT

The paper updates the regular reviews of the state of fish stocks, based mainly on statistics for 1984. The introduction refers to the increase in world fish production, draws attention to major changes noted in specific fish stocks, reviews some recent trends in stock assessment as they relate to fisheries development and management. The rest of the document provides a review of the state of the stocks in the main FAO statistical marine and inland areas, as well as a review of oceanic tuna and billfish resources.

W/S2876

For bibliographic purposes this document should be cited as follows:

FAO, Marine Resources Service, Fishery Resources and Environment
1987 Division, Review of the state of world fishery resources.
FAO Fish.Circ., (710)Rev.5:64 p.

The FAO fisheries circular is a vehicle for distribution of short or ephemeral notes, lists, etc, including provisional versions of documents to be issued later in other series.

TABLE OF CONTENTS

		Page
A.	INTRODUCTION	1
	Fisheries research and fisheries development	3
B.	REGIONAL REVIEWS	4
	Northwest Atlantic (Area 21) (Table 3)	4
	Northeast Atlantic (Area 27) (Table 4)	6
	Western Central Atlantic (Area 31) (Table 5)	8
	Eastern Central Atlantic (Area 34) (Table 6)	10
	Mediterranean and Black Sea (Area 37) (Table 7)	12
	Southwest Atlantic (Area 41) (Table 8)	14
	Southeast Atlantic (Area 47) (Table 9)	16
	Western Indian Ocean (Area 51) (Table 10)	16
	Eastern Indian Ocean (Area 57) (Table 11)	18
	Northwest Pacific (Area 61) (Table 12)	20
	Northeast Pacific (Area 67) (Table 13)	22
	Western Central Pacific (Area 71) (Table 14)	25
	Eastern Central Pacific (Area 77) (Table 15)	27
	Southwest Pacific (Area 81) (Table 16)	28
	Southeast Pacific (Area 87) (Table 17)	29
	Southern Oceans (Areas 48, 58 and 88) (Table 18)	31
	Oceanic Tunas and Billfishes (Table 19)	32
C.	REGIONAL REVIEWS OF INLAND WATER RESOURCES	35
	Africa (Area 01)	36
	North America (Area 02)	37
	South America (Area 03)	37
	Asia and the Pacific (Areas 04 and 06)	37
	Europe and USSR (Areas 05 and 07)	38
D.	AQUACULTURE (FRESHWATER, BRACKISH AND MARINE)	38
TABLES		39

Digitized by the Internet Archive
in 2025

https://archive.org/details/fao-fisheries-and-aquaculture-circular_1987_710-revision-5

A. INTRODUCTION

Recent trends

A sharp increase in recorded fish landings of marine and freshwater fish was noted in 1984-85 with a record catch of 85.0 million tons in 1985 equal to a 10.7% rise over 1983 (see Table 1 and Fig. 1). This is due mainly to the increase in the catch of marine species other than anchoveta. The average increase in total world landings of 3% per year over the last five years, however, masks the considerable number of much larger percentage changes in recorded landings of individual species or species groups.

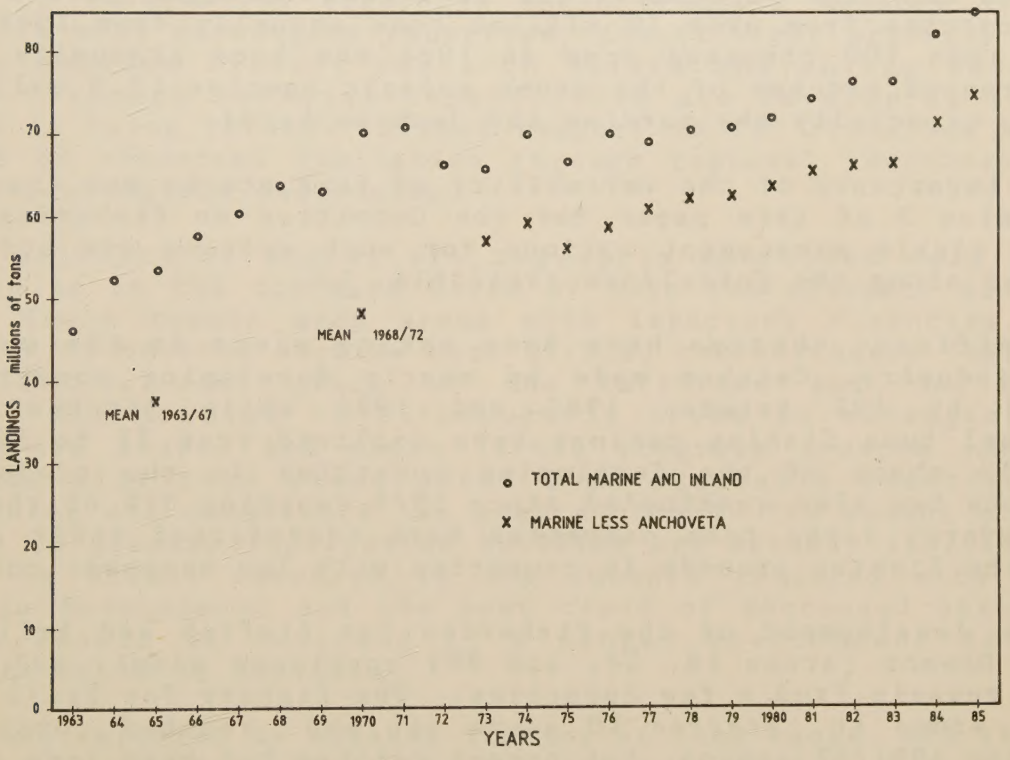

Figure 1 Annual world landings of aquatic resources (excluding mammals and plants)

Some of the major changes occurred in the catch of the shoaling pelagic species which seem particularly liable to long-term natural changes. The causes of these natural changes are seldom clearly known or understood. One of the most dramatic has been the increase in catches of the Japanese sardine in the coastal water around Japan. The catch of this species was down to around 9 000 tons in the mid 1960's but exceeded 5 100 000 tons in 1984. The catches of the other small pelagic fishes have declined somewhat now, probably related to the recent outburst in the sardine catch. These appear to be natural changes with little evidence of a direct link with fishing.

The effects of the 1982/83 "El Niño" phenomenon appear to have subsided for the fish and the fisheries along the Pacific Coast of South America. The distribution and abundance of the sardine, jack mackerel and chub mackerel, as well as anchoveta, were all affected one way or another by "El Niño" which led to changes in the fishing patterns in Ecuador, Peru and Chile. These changes were of major importance to these countries as the four species make up 90% of the total catch in the area. The reported total catches in 1984 were the highest since 1971 and were almost 2 million tons greater than 1983.

The Southeast Pacific (Area 87) seems to be an example of the apparent balance between species as the collapse of one species results in the rise of others. The well-known decline of the Peruvian anchovy catches from over 10 million tons annually from 1968 to 1971 to less than 100 thousand tons in 1984 has been gradually replaced with increased catches of the other pelagic species (7.5 million tons in 1984), especially the sardine and jack mackerel.

The importance of the variability of fish stocks was discussed in the Revision 3 of this paper for the Committee on Fisheries is June 1983 and viable management options for such systems are still to be identified along the guidelines available. 1/

Significant changes have been taking place in the world tuna fishing industry. Catches made by mostly developing countries have increased by 40% between 1980 and 1984 while catches made by traditional tuna fishing nations have declined from 75 to 69% of the total. The share of the developing countries in the production of canned tuna has also quadrupled since 1979 reaching 31% of the world's total. Several large tuna companies have transferred their canneries to near the fishing grounds in countries with low manpower costs.

The development of the fisheries for finfish and krill in the Southern Oceans (Areas 18, 58, and 88) continues slowly and is based on large vessels from a few countries. The fishery for krill expanded rapidly since it started 10 years ago and reached over 500 000 tons in the 1981/82 season, but recent catches had been less than half that amount, possibly reflecting the decreasing demand for krill. However, several countries have reported recent success in preparing krill products and the reported catch in 1985/86 increased to 430 000 tons. Catches of finfish have remained fairly constant over the past few years. Antarctic icefish presently dominates the catches, but in general, these slow growing fishery resources are fully exploited or overexploited.

1/ For instance in Csirke J. and Sharp G.D. (eds) 1983. Reports of the expert consultation to examine changes in abundance and species composition of neritic resources. FAO Fish.Rep., 291(1):102

It is difficult to separate catches from inland waters and harvests from aquaculture in the statistics. Yields from the two activities together continued to grow with 9.7 million tons reported in 1984, an increase of some 38% since 1978. The largest share of the total catch comes from Asia which is also responsible for 80% of the increased catch reported since 1978. Catches from Africa have remained relatively unchanged over the same time period. A closer examination of aquaculture yields is presented in document COFI/87/Inf.6 - Aquaculture Devevelopment.

Fisheries research and fisheries development

Leading donor agencies (World Bank, UNDP) have recently undertaken a depth review of their fisheries development projects, and the low rate of success of these projects is acknowledged to be a matter of concern. One major reason for failure has been identified in the lack of proper information (or lack of consideration of information) on fishery resources available for exploitation before the projects start and lack of monitoring of the reaction of stocks to increased exploitation. Similarly there is an even more acute shortage of information regarding socio economic aspects of fishery systems. In many developing countries, insufficient priority is being given to applied fishery research before and during development projects although national capabilities are developing slowly as awareness is being raised. Direct support to FAO Fisheries bodies in the field of resources evaluation through regional technical support units is also rapidly decreasing.

The majority of stocks are regularly monitored only in a few areas such as in the northern parts of both the Atlantic and Pacific oceans. There remain many areas with important fisheries not yet satisfactorily covered such as West Africa, the northwest Indian Ocean and the Gulfs, some areas of the Caribbean and the Southwest Atlantic. The problem is particularly acute in subregions where resources are shared and where little progress towards coordinated management will take place until some equitable distribution of understanding and competence has been achieved. The amount of funding necessary to promote institution building and develop applied fishery research is dismal compared to the amounts invested with variable success in development and the past trend of decreased attention to research should be reversed if a proper environment to fishery development is to be provided.

Catches reported by vessels fishing at long range, off the shores of other countries (except in the Southeast Atlantic), keep decreasing as foreign fishing decreases or is replaced by joint ventures. Table 2 records trend for four areas and shows that while the long range catches in the Northwest Atlantic have remained at around 10% over the past five years, the reported catches in the Eastern Central Atlantic and Northwest Pacific have dropped below 50% illustrating the fact that some coastal States are gradually replacing non-local fleets by national ones and joint ventures. Catches from long range operation still remain high in the Southeast Atlantic with 62% of the reported catches being taken by foreign vessels.

B. REGIONAL REVIEWS

NORTHWEST ATLANTIC (Area 21) (Table 3)

Total nominal catch (landings) of finfish and invertebrates in 1984 was 2.7 million tons, down slightly from the 1982-83 average of 2.8 million tons. Landings have remained within this range since 1980, which probably reflects the fact that fisheries in the region have now adapted to the new legal regime.

Landings by weight have been dominated by ground fish (45%) and invertebrates (32%) with pelagics and other fish accounting for the remainder.

Resolution of the Georges Bank-Gulf of Maine boundary dispute has impacted significantly on exploitation patterns as productive fishing areas NE and SW of the new boundary on Georges Bank are no longer available to USA and Canadian fishermen respectively, since there are no provisions for joint Canadian-USA management or reciprocal fishing activity on transboundary stocks at present.

The coastal States in this region have sharply curtailed distant-water effort in their exclusive economic zones. Management of shelf areas seaward of 200 miles has been conducted under the auspices of the Northwest Atlantic Fisheries Organization or NAFO, which has generally pursued a strategy for these stocks of harvesting at the $F_{0.1}$ [1/] level. Stocks considered to overlap Canada-Greenland and Canada-EEC boundaries, and to extend beyond the Canadian 200 mile limit into international waters, are assessed by the NAFO Scientific Council at the Coastal State request. The application of the scientific advice to management is, however, dealt with through bilateral or multilateral arrangement.

The $F_{0.1}$ criterion is now the most commonly used management benchmark, both within and outside NW Atlantic exclusive economic zones, and is considered to generate greater benefits for the coastal state than the more traditional f_{MSY} level which implied that stocks had to be fished up to their maximum biological production. This has been shown to generally result in uneconomic levels of fishing effort, and increased fluctuations in annual catches.

Many cod stocks in this area have been managed under an $F_{0.1}$ strategy since 1977 and a significant degree of stock rebuilding has occurred. During 1980-84, cod landings fluctuated between 600-700 thousand tons, substantially below the estimated potential for this region. Cod stocks in NAFO Subareas 5 and 6 have been more intensively exploited and since 1982, both abundance and landings have declined.

Haddock landings and abundance have declined since 1981. The Georges Bank stock partially recovered during the late 1970's but since 1980 recruitment has been poor and abundance again declined sharply. The condition of the Browns Bank haddock stock has also deteriorated.

1/ The level of effort at which the increase in catch produced by one additional unit of effort (marginal yield) is less than 1/10 of the catch rate obtained at very low levels of effort.

Pollock abundance has increased to at or near historic highs in recent years. Exploitation has remained at or near the $F_{0.1}$ level and recruitment has been generally good.

Redfish stocks are generally in good condition and are expected to remain that way for the foreseeable future due to improved recruitment. The notable exception is for the Gulf of Maine redfish stock, which has declined to very low levels. Little improvement is expected from this stock.

Flatfish landings have gradually declined since 1980, apparently due more to economic conditions or changes in fishing patterns than to declining abundance. Flatfish stocks are generally in good condition, although again, stocks in NAFO Subareas 5 and 6 have been more intensively exploited and abundance has declined.

The Northwest Atlantic mackerel stock has been rebuilt due to low catches and strong recruitment in recent years. In contrast, Atlantic herring stocks have declined and there is little evidence for improvement of Georges Bank herring. Reduced landings in the region have been attributed to reductions in abundance, availability changes and economic factors, i.e., reductions in demand due to recovery of European stocks.

There is a considerable potential for increased landing of catches of other finfish species, e.g. dogfish, skates, and sand lance, in the southern part of this region. There has been little or no attempt to develop expanded fisheries for these species.

Lobster landings have gradually increased in recent years while scallop landings have generally declined despite application of management measures in both cases. Both species have been fished very intensively, and this has emphasized the long term effects of recruitment fluctuations.

Northern shrimp landings have remained relatively stable since the early 1980's. Abundance appears to have been generally stable although declines have been noted off Labrador while in the Gulf of Maine and the Gulf of St. Lawrence abundance has increased. Crab landings have fluctuated without a clear trend.

Landings of squid, particularly Illex, have declined significantly since 1980, due to reduced abundance and to restrictions on distant-water effort in Subareas 5 and 6, and to the virtual absence of fishable concentrations of Illex in Subareas 3 and 4 in most recent years. The importance of climatic variations on squid abundance cannot be discounted entirely.

Recovery of capelin stocks has been substantial after reaching minimum levels at the end of the 1970's. Catches have been kept to low levels, however, both to promote resource recovery and in recognition of the importance of capelin as a food resource for the more commercially valuable cod.

Silver hake in Subarea 4 has increased in abundance substantially in most recent years under a regime of moderate exploitation. Most southern stocks (in Subareas 5 and 6) have remained at relatively low levels of abundance, however, despite light exploitation.

Tuna and billfish stocks in the region fall within the terms of reference of the International Commission for the Conservation of Atlantic Tunas (ICCAT) and are reviewed under the relevant section on Ocean Tunas and Billfishes.

NORTHEAST ATLANTIC (Area 27) (Table 4)

Most of the major fish stocks in Area 27 are distributed across more than one zone of national fisheries jurisdiction and accordingly are managed and fished under agreements between countries and, where appropriate, involving the European Economic Community which are achieved either through bilateral and multilateral negotiations or by one of several international commissions (North-East Atlantic Fisheries Commission, International Baltic Sea Fishery Commission, and North Atlantic Salmon Conservation Organization). The scientific advice on which management measures are based (e.g., total allowable catches, minimum mesh sizes) is provided by the International Council for the Exploration of the Sea through its Advisory Committee on Fishery Management (ACFM).

Total reported nominal catches in 1984 were 11.3 million tonnes, compared to 11.1 million tonnes in 1983. Of this amount, 10.4 million was finfish and 0.9 million was invertebrates. Actual catches (as estimated by scientists) for many stocks were higher than the officially-reported figures due to unreported or misreported landings, discards, etc. The most serious discrepancies in 1984 were associated with herring in the North Sea, Skagerrak and Kattegat, and west of Scotland and Ireland; roundfish (cod, haddock, whiting, and saithe) in the North Sea; and plaice and sole in the North Sea. The unofficial estimates of total catch provided by scientists are used in the assessments produced by ICES working groups which form the basis for the management advice given by ACFM.

Most of the groundfish stocks continued to exhibit downward trends due to excessive fishing pressure, undesirable exploitation patterns (i.e, too much fishing on young age groups), and, in some cases, poor recruitment. Some or all of these circumstances apply to most stocks in the North Sea, the area to the west of the British Isles, around the Faroe Islands, and the Baltic Sea. Fishing mortality rates for most of these stocks are in excess of the F_{max} reference point. This applies especially to the North Sea cod stock, for which the fishing mortality has continued to rise while catches have been dropping since 1981 and stock size has declined to its lowest recorded level. Although recruitment continues to hold up (a pattern of alternating weak and strong year classes has persisted since the mid-1970s), the fishery is becoming more and more dependent on young fish.

Catches of North Sea sole have increased steadily from 1981 to 1984, while stock size has declined since the mid-1960s and fishing mortality has increased. Although there is no evidence of an adverse trend in recruitment, the present level of spawning stock biomass is near the minimum acceptable level. For North Sea plaice, catches and fishing mortality have steadily increased over the past 30 years, whereas spawning stock biomass has declined since 1967 to a near-record low. Surprisingly, there has been strong recruitment in recent years and no evidence yet of adverse effects due to the reduced spawning stock.

The North-East Arctic cod and haddock stocks have had declining catches since the early 1970s due to declines in stock size, caused by high fishing mortality and poor recruitment. However, recent strong recruitment beginning with the 1982 and 1983 year classes will result in some recovery of these stocks. In contrast, the Barents Sea capelin stock has undergone a dramatic decline, with the total stock biomass dropping from 2.9 million tonnes in 1984 to only 0.8 million tonnes in 1985. The sharp decrease appears to be due to ecological (possibly predation by cod) and not to fishery factors.

In the North Sea industrial fishery, landings of Norway pout decreased from 1983 to 1984 with indications of a further drop in 1985 due to a declining stock. Sandeel catches increased from 1983 to 1984, but the status of the resource is uncertain due to insufficient data on which to base assessments. Sprat catches have been continually declining since the late 1970s and research vessel surveys indicate recent poor recruitment and very reduced levels of stock biomass.

Catches from the two hake stocks in the southern half of Area 27 have, as a whole, increased from 1983 to 1984. The status of these stocks is uncertain due to poor data and unreliable assessments, but it is evident that there is excessive fishing mortality on young fish. The catch from the sardine stock off the coasts of Spain and Portugal increased in 1984. Spawning stock biomass has declined since 1981, although there is a strong 1983 year class.

The catch from the northern blue whiting stock (distributed from west of the British Isles to the Barents Sea), after declining from a high of 1.1 million tonnes in 1979-80 to 540,000 tonnes in 1983, increased to 605,000 tonnes in 1984. This stock, the largest in Area 27, declined from a peak of about 8.4 million tonnes in 1975 to about 5.6 million tonnes in 1982. The large 1982 and 1983 year classes will, however, result in an increase in stock size and catches over the next few years.

In contrast to the declining trends of many of the groundfish and capelin stocks, there has been a recent sharp increase in the abundance of many of the herring stocks, notably the North Sea, Norwegian spring-spawning, and Icelandic summer-spawning stocks, due to strong recruitment. The Icelandic stock in 1985 was at about the highest recorded level due to strong 1979 and 1983 year classes. The Norwegian stock is projected to improve considerably because of the strong 1983 year class. The North Sea herring (particularly in the central and northern parts of the North Sea) has been experiencing steadily improving recruitment since 1980-81, with the 1984 year class being one of the strongest recorded.

The stocks of mackerel in the North Sea and west of the British Isles have been declining since about 1973-74 as a result of increased fishing pressure and, in the case of the North Sea stock, poor recruitment. However, the 1982 and 1983 year classes in the western stock were very weak. The current spawning stock biomass for both stocks is at the lowest recorded level. A strong 1984 year class offers the opportunity for rebuilding both stocks, although it is yet unclear to what extent this year class will recruit to the North Sea spawning stock.

In the Baltic, catches of cod and sprat increased in 1984 while those of herring decreased. Both cod stocks have been fished heavily; the smaller western stock has declined sharply since 1980 and the larger eastern stock, although having increased until 1983, is expected to decrease in subsequent years because of poor recruitment and high fishing mortality. The sprat stocks, after declining markedly from high levels in the mid-1970s, are recovering. Of the approximately eight herring stocks in the Baltic, some are fished at levels well above $F_{0.1}$, others at levels close to $F_{0.1}$, while at least one is fished below $F_{0.1}$. There are different trends in stock size. In spite of separate TAC recommendations for each herring stock by ACFM, the IBSFC sets an overall TAC for the Baltic which offers no protection for the overfished stocks.

Advice relative to the management of salmon thorughout the North Atlantic has been provided by ICES to the North Atlantic Salmon Conservation Organization (NASCO) since 1984.

As a general rule throughout Area 27, the agreed TACs have exceeded the TACs recommended by ICES and the actual catches have exceeded the agreed TACs. Enforcement of management measures has not been adequate in all areas and many problems arise from the fact that a great number of the regulated stocks are taken in mixed fisheries. ICES has recognized the need for multispecies assessments from the standpoint of ecological relationships among species as well as technical fisheries interactions. Research is in progress to develop multispecies assessment models for both the North Sea and the Baltic.

WESTERN CENTRAL ATLANTIC (Area 31) (Table 5)

Reported landings from the commercial fisheries in the region continue to rise with a record level of 2.6 million tons in 1984. This figure must be qualified because it does not include the catch by sports fishermen, or the quantities discarded at sea by commercial shrimp trawlers. Along the US Gulf and South Atlantic coasts the catches of the preferred species by sports fishermen generally exceed the commercial catches. Discards by shrimp trawlers continue to be significant, though variable, for different shrimp fisheries in the area. Subtraction of these from the potential for increases in groundfish production suggested in Table 5, reduces the potential for further expansion of bottomfish catches, though this remains significant. Groundfish stocks on the outer shelf and slope remain relatively untouched throughout Area 31. However, new information on the relatively slow rate of growth of deep water snappers and groupers tend to reduce our perception of the potential yield from these resources.

Significant increases in landings were recorded over the past several years by Cuba, Venezuela and U.S.A.. Cuban catches have declined slightly from a peak around 1976. This, however, has largely been a result of lower emphasis in recent years on the distant water fleet. Domestically, improved management in Cuba through a system of local "fisheries bureaux" appears to have stabilized or increased landings of several valuable coastal resources.

The expansion of the Venezuelan tuna fishery in the area has been a noteworthy feature of high seas fishing in the region. Although fishing by distant water fleets continues for shrimp in the Guianas-Brazil area, and for tuna offshore, a marked development of

fishing capabilities by the larger coastal States of the area continues to take place.

Catches of Gulf menhaden reached 983 000 tons in 1984, an increase of 6%. Catches of small pelagic fish have reached significant levels in the upwelling area of the Southwest Caribbean (Venezuela), and although the presence of a significant biomass of these resources has been identified in the Guianas-Brazil region, exploitation to date has been limited.

The scattered nature of most of the fisheries (other than menhaden and shrimp) and the deficiencies in much of the basic data on statistics, etc., continue to make accurate assessments difficult. Progress is being made, especially through regional collaboration, e.g., by the Western Central Atlantic Fishery Commission's Working Party on Assessment of Marine Resources, where comparison between areas in different countries with similar ecological characteristics (e.g., coral reefs) are giving promising results. These indicate, for example, that the yield from shelf areas around the Caribbean islands is around 0.5-1.5 $t/km^2/year$. This is rather less than some earlier estimates, which tended not to take account of the proportion of relatively unproductive sandy bottom. These results also seem to confirm earlier impressions that much of the demersal resources are already fully exploited, and that the greatest potential for expansion will come from the smaller pelagic fish, the largest migratory oceanic pelagics, as well as possibly from squid and other less familiar types of fish. Since many of these species move over considerable distances (greater, for example, than the distances between the adjacent islands in the Lesser Antilles chain), their utilization and rational management should involve close collaboration between these countries. Some of the species of high interest are tunas (especially skipjack, yellowfin, blackfin and bonito), the wahoo and dolphin fish: which have a broad distribution throughout the Eastern Caribbean. Swordfish spawning areas in the Auville region are also offering promising opportunities with a southward expansion under license of US vessels from the Straits of Florida. The dramatic increase in the Barbados fishery for flying fish and dolphin fish point to the increased potential possible when time at sea extends beyond day trips, but also illustrates the problems with storage and marketing which can result from uncontrolled expansion.

Great interest has been expressed in recent years in the question of stock identity of key resources (e.g., spiny lobster, conch and dolphin fish), and new techniques to identify stocks (e.g., protein electrophoresis) are being employed. Indications are that more than one stock of pelagic fish (dolphin fish, flying fish and king mackerel) exists in Area 31 although stock boundaries remain to be defined for most species.

The marine resources of the area fall within the terms of reference of the Western Central Atlantic Fisheries Commission (WECAFC). The Commission and its two working parties (on marine resources and statistics) meet in alternate years, as does its Committee for the Development and Management of Fisheries in the Lesser Antilles. To date WECAFC has been a consultative forum and has not realized its potential role in setting regulations or managing resources. With some notable exceptions, this latter function is still at a relatively early stage of development for most countries of the area, although improvements to the regulatory framework for fisheries have been notable in some areas in recent years.

Tuna and billfish stocks in the region are reviewed in the relevant Chapter of this review and fall within the terms of reference of the International Commission for the Conservation of Atlantic Tunas (ICCAT).

EASTERN CENTRAL ATLANTIC (Area 34) (Table 6)

The assessment and elaboration of biological advice for management of the resources of this region is undertaken by the Fishery Committee for the Eastern Central Atlantic (CECAF). The reported catches from this region were down to 2.6 million tons in 1984 compared to the annual catches from 1980 to 1983 which varied from 3.0 to 3.4 million tons. The decline in catches of horse mackerel was one of the major reasons for this. The reported catches by coastal countries have not changed much except for a decline in the catches reported by Nigeria. Mention should be made that foreign fleets have adopted to the new regime of the oceans, and are now working under fishery licenses or joint venture agreements.

The CECAF Regional Project on the Development of Fisheries in the Eastern Central Atlantic has continued to promote, as in the past, evaluations of the state of the stocks. On the whole there have been no notable changes and, in general, most of the stocks are heavily fished or overfished while coastal countries are progressively acquiring the necessary competence and legal framework necessary to deal with their exclusive economic zones.

Northern Sector

In the northern sector of CECAF, to the north of Cape Timiris (Mauritania), the demersal stocks are almost fully exploited or overexploited. These include cephalopods, hakes, sparids, the one possible exception being the stock of black (Senegalese) hake found to the south of Cape Juby. The catch rate of cephalopods is now only 10 percent of that obtained at the beginning of the exploitation and the fishery is in a critical economic situation. The stocks of white (Moroccan) hake are overexploited with too high a fishing effort and too small a mesh. Recent analyses have demonstrated the excessively high level of mortality applied by Moroccan trawlers to small hake, but have also shown that a correction of this biologically suboptimal fishing strategy would primarily benefit foreign fleets fishing for older hakes, as well as shrimps on the continental slope. The state of the stock of shrimps exploited together with the hakes has not yet been assessed. The coastal stocks of sparids are heavily exploited to the north of Cape Juby and markedly overexploited to the south of Cape Bojador, where the important recovery of the stock is threatened by the rapid expansion of the cephalopod fishery which is incidentally producing a high fishing mortality on juvenile sparids.

The stocks of sardines found to the north of Cape Bojador undergo considerable year-to-year fluctuations in abundance in relation to environmental conditions. However, long-term trends in the upwelling strength have seriously reduced the accessibility of the stock to the traditional Moroccan fishery. The sardine catch was up in 1983 but declined in 1984. The catches of the sardine stocks south of Cape Bojador are still at a low level compared to the 1970's. Acoustic estimates of sardine biomass in this area were high in 1982 and declined in 1983-84 but were higher than the 1980/81 estimates.

The stock of horse mackerel in the northern sector of CECAF area is estimated to have a potential of about 400 000 tons. However, recruitment has shown a decreasing trend since 1979 and the horse mackerel catch has been dropping annually since 1982. The stock of mackerel is estimated to be about 100 000 tons and is thought to be fished beyond the level of the MSY. Wide year-to-year fluctuations in abundance (or availability) are observed for these two resources, implying that these conclusions must be considered with caution. The variations in apparent abundance of sardines are inversely correlated with the variations of mackerel and horse mackerel. The trumpet fish (Macroramphosus spp.) seems to be an unstable resource. Its potential production was estimated as being 400 000 tons in 1979, but these resources seem now almost to have disappeared without any fishery having developed.

In the Mauritania-Senegal sector the fishery has undergone major developments in the last ten years, due to increases in fishing by foreign fleets and development of national fishing capacity. Catches have not increased and all the stocks traditionally exploited are considered at least fully fished. The levels of abundance of demersal and pelagic stocks off Mauritania have been seriously reduced since the early seventies and the future of the resources is a matter of concern. Horse mackerels recruitment has been drastically reduced since the beginning of the eighties. Abundance of mackerels is now only about 20 percent of the levels observed in 1970. The same conclusion applies to sardinella and the combination of the long term changes in stocks size due to climate, with the presently excessive levels of effort, is a matter of concern as other regions of the world have shown that it could lead to a fishery collapse. The demersal fish community of the shelf is very severely damaged by extensive fishing. The deep sea fish community living on the slope (hake, shrimp, sea bream) is also severely exploited, probably by foreign fisheries licensed for pelagic fishing. The stock of lobsters, depleted in the late sixties is recovering slowly.

Southern Sector

In the Sherbro area (Sierra Leone and Liberia) the state of the stocks is not well known. It has been heavily fished by foreign fleets in recent years, but biological data and statistics are still inadequate for a detailed scientific analysis. The stock of Balistes capriscus which developed in the late seventies in Sierra Leone is still abundant and represents an important share of the pelagic biomass.

In the Gulf of Guinea, from the south of Sierra Leone to the Congo estuary, the continental shelf is narrow and the density of stocks lower than in the north. The estimate of the potential demersal catches is thus low - between 240 000 tons and 300 000 tons. The estimate includes the potential of small, but relatively abundant species, e.g., Brachydeuterus auritus which is not generally caught, or at least not marketed, in the northern part of this sector. Throughout the sector, the most commonly captured fish species close to the coast, in depths less than 50 m, seem to be fished at about the level of maximum exploitation. The demersal stocks further offshore from 50 m to 200 m are still some way from full exploitation. However, it is unlikely that their exploitation rate will increase because the fishery is not economically attractive due to the lower density of fish and catch rates, and higher fishing costs.

With total catches of the order of 15 000 tons, the pink shrimp (Penaeus notiatilis) present in small concentrations from Senegal to the Congo seems to be exploited at the level of maximum biological production. Competition exists between artisanal inshore and industrial offshore fisheries. In Sierra Leone the stock is biologically underfished but the size of the fleet corresponds roughly to the maximum economic yield.

The effect of changes in the mesh size used in trawling for fish, shrimp and cephalopods in the Gulf of Guinea, has been examined. These studies show that it would be useful at the first stage to adopt a 60-mm mesh (stretched mesh) for all trawling operations. This mesh size was recommended by CECAF in 1979, but is not yet strictly enforced.

The present state of pelagic resources in the sector is poorly known with the lack of adequate research in the Sherbro sector from Guinea Bissau to Liberia and from Gabon to Angola. The sardinella stock of Togo, Ghana and Ivory Coast has undergone large variations in abundance and was nearly extinct between 1972 and 1975. The stock has now recovered to a reasonable level. The recent great reduction in the stock of bonga in the Aby Lagoon in the Ivory Coast was due to overexploitation by excessive development, of the artisanal fishery combined with reduced fresh water input in the lagoon.

Two important stocks of the triggerfish (Balistes capriscus) have developed since the early 1970s in the Ivory Coast-Benin sector and in the Guinea Bissau-Sierra Leone sector. The biomass in the whole Eastern Central Atlantic, which originally was negligible, has now reached about 1 500 000 tons. This stock is being exploited but opportunities may exist to increase benefits to and consumption by the coastal States.

MEDITERRANEAN AND BLACK SEA (Area 37) (Table 7)

Advice and recommendations for the management of the resources of this area are elaborated through the General Fisheries Council for the Mediterranean (GFCM) and the Joint Commission on the Fisheries of the Black Sea.

The total reported catches continued to increase slowly in 1983 and 1984 but were not much different than the 1982 catch. The catch of coastal pelagic species has been responsible for most of the reported increase since 1980.

Since 1980 the evaluations of the resources have been updated as regularly as possible within the framework of GFCM in a series of technical consultations held every year in the Western and Central Mediterranean area, as well as in the Adriatic Sea area. A recent consultation has begun the task of setting up a mechanism for cooperation within the Eastern Mediterranean area which concerns several countries and a wide range of levels of fish exploitation.

In the Western Mediterranean all the stocks are very heavily exploited except possibly the mackerel and horse mackerel and one cannot expect any significant increase in catches, at least in the traditionally fished areas. Long-term fluctuations in abundance (not due directly to exploitation) should be noted for the stocks around

the Balearic Islands (for hake and red mullet). The assessment of pelagic stocks, which might offer a potential for fisheries expansions, remains a problem throughout the region and there has been little progress. Pelagic species composition changes have been observed in the catches of recent years with a gradual shift from a sardine to anchovy dominated catch in Spain, Morocco and Algeria. In Morocco the phenomenon seems to be clearly due to changes in market preferences. Recently the scientists presented to the GFCM Committee on Management conclusions on overfishing of the hake in the Gulf of Lions and proposed inter alia a reduction in the level of effort.

In the Adriatic there is evidence of major overfishing of most of the highly valued demersal species such as hake and red mullet. Economic studies should be undertaken for an objective evaluation of the real cost of overfishing to the State and to the consumer, the economic losses deriving from overfishing and the economic risks thereof for the different sectors of the industry, including coastal fisheries. Measures to regulate mesh size or protect juveniles (like closed areas or seasons) should be examined together with measures to regulate the amount of fishing effort. A major question remains to be practically dealt with, i.e. the problem of coordinated management of shared resources. The degree of mixing between Italian and Yugoslavian demersal and pelagic resources and the consequent need for coordinated development and management programme is still to be assessed.

In the Central Mediterranean the demersal resources generally are fully exploited to heavily overexploited. Off Italy the stocks are very heavily fished, and the density of fish is about one-fifth of those in Tunisian waters. The small size of fish caught in Italian waters, both in the Adriatic and in the Central Mediterranean, clearly shows gross overfishing (loss of potential yield through catching fish when they are too young). The small pelagic fish, both those along the coast (sardines), and those offshore (horse mackerel) are still lightly exploited mainly for economic reasons.

In the Eastern Mediterranean, the small mesh size in use in many countries, especially Greece, Cyprus and Egypt as well as the reduction of freshwater outflow of the Nile has obviously had an unfavourable impact on stocks, including reduced catch rates and changes in species composition, as well as being reflected in the local price structure for different species. In several countries, despite high prices for bottom fish, seasonal discards, especially but not exclusively of small pelagics, have become significant, and minimum landed size regulations in some countries have certainly not helped prevent this. Questions of access by different fleets to nearshore zones is also a source of controversy, and has been effectively approached, e.g., in Cyprus, by seasonal closures. Nursery areas of importance for early recruitment of important species should be identified on a priority basis.

In summary, in the Mediterranean proper, the pelagic stocks offer the best possibilities for increased production through rational exploitation, but the progress made so far is still disappointing. In several areas the horse mackerel in deeper waters could produce more if fished harder and if its exploitation is made profitable by the use of new techniques etc... However, there are signs of overexploitation in sardine stocks in the Western Mediterranean. Because of the evidence of long-term changes in species abundance, these conclusions must be taken with caution. Elsewhere this species is fully

exploited. In the Black Sea, there is concern over the stocks of anchovy and horse mackerel. If indeed the exploitation of these species has been intensified in the past few years, there has not been parallel progress to be observed in the collection of data, and in the monitoring of the resources.

The complex of problems faced in many Mediterranean countries with fishery management are most clearly focussed on the coastal zone, where critical habitats for fisheries (nursery areas, sites for aquaculture development), often encountered uncontrolled expansion in the use of the same areas for other human activities, e.g. tourism, waste disposal.

The major problem encountered is one of excess of fishing capacity; more collaboration on research oriented towards coordinated management and development is needed, especially but not only in resources accessible to more than one country.

SOUTHWEST ATLANTIC (Area 41) (Table 8)

Total catches have been steady over the last three years at a level of 1.5-1.7 million tons a year.

One of the main fishery in this area is that of hake, Merluccius hubbsi, exploited almost entirely by Argentinian and Uruguayan fleets. Catches of hake dropped to 262 000 tons in 1984, after being more or less constant at about 350-360 000 for several years. This stock seems to be moderately exploited, and the reduced catches seem to be caused primarily by a reduced fishing effort directed toward this stock.

No major changes have been observed in the catches of croakers and weakfishes. Several local stocks of these species are found in the area, and most are moderately or fully exploited. Some limited possibilities for future expansion of some local fisheries are available, particularly in northern Brazil. The stock of weakfish off the River Plate Basin was heavily exploited, but following some management measures introduced in 1983, the stock seems to be recovering.

The catches of squids have increased rapidly from 1980 to 1984 going from 31 to 54, 208, 205 and 258 thousand tons respectively. Around 220 000 tons are short finned squids (Illex spp) caught mostly by Polish and Japanese fleets along the border of the Patagonian shelf and slope and by Argentina in the more coastal zone. Around 35 000 tons are flying squids (Loliginidae) caught along the border of the southern Patagonian shelf and slope by Spanish and Soviet fleets.

Catches of Sardinella were maintained at the same high level. Brazil reported a total catch of 197 000 tons of this species in 1982 and 260 000 tons in 1983 and 1984. This stock seems to be fully exploited. Other stocks of clupeoids and other small pelagic stocks in the area seem to be lightly exploited or virtually unexploited. The stock of anchoveta off the River Plate Basin is also virtually unexploited. Some attempts are now being made to increase catches of these species, particularly for use for fishmeal, but the catch is still very low. The estimated potential is in the order of 1 million tons. Catches were 28 000 tons in 1983 and 26 000 tons in 1984.

One major change has occurred in the stocks of red shrimp (Pleoticus muelleri) off Argentina. Catches have been increasing steadily from 2 600 tons in 1981 to 22 000 tons in 1984. This change in catches seems to be associated with both an increase in the overall abundance of the stock and the increased interest in the fishery by other fleets that traditionally were fishing for hake or other demersal species in other areas off the Argentinian coast. No estimate of the long-term potential of this stock is available, and there are some indications that both the area of distribution and the overall abundance of this stock has been increasing over the past few years. The question is how long this period of high abundance will last. In the meantime, investment and fishing for red shrimp continues to increase. Some regulation measures are being introduced by the Argentine authorities in an attempt to manage the development of this fishery.

A major change has also been noticed in the catches of southern blue whiting (Micromesistius australis). Fishing for this species has been increasing steadily over the past few years with catches increasing from 140 000 tons in 1982, to 260 000 tons in 1983, and then dropping to 113 000 tons in 1984. Most of the catches are made by Polish fleets, and to a lesser extent by Soviet fleets on the southern part of the Patagonian Shelf and slope. This stock, which until a few years ago was virtually unexploited or very lightly exploited, now seems to be fully exploited with a risk of becoming an overexploited one if the fishery pressure continues to increase. Grenadier (Macrourus spp.) in the Patagonian Shelf and slope also increased from below 1 000 tons in 1981-82 to 18 000 tons in 1983 and 31 000 tons in 1984.

The Patagonian Shelf area provides a good example of shared stocks occurring in both the exclusive economic zones and the areas beyond and adjacent to it, and it is clear that with the current increase in fishing effort in the area there is a growing need for international cooperation to manage these fisheries and to ensure conservation of the resources both within and beyond the waters under national jurisdiction.

There is no regional or international organization responsible for the management or the research of shared stocks occurring in both the exclusive economic zones and beyond and adjacent to it in the Patagonian Shelf area. FAO convened a working party in February 1983 (see FAO Fish.Rep., No.297) to analyse the scientific information available on part of the area (north of 48°S) and no signs were observed at that time of fish stocks being seriously affected, although fishing effort by long-range fleets of several fishing nations has noticeably increased since then. FAO is now undertaking a study to assess the status of the main stocks being exploited by international fleets in the southern Patagonian area.

Argentina and Uruguay have established a common fishing zone in the River Plate Basin, and a Joint Technical Committee, operational since 1974, is responsible for coordinating research and facilitating the adoption of bilateral agreements for management of fisheries in the common zone.

In Brazil there are around ten inter-state permanent working groups responsible for providing advice on the management of an equal

number of fisheries along the Brazilian coast. Depending on the circumstances, these permanent working groups meet periodically to update the information and data and assess the situation of the given stocks or group of stocks for which they are responsible.

SOUTHEAST ATLANTIC (Area 47) (Table 9)

The exploitation of the stocks of this region is monitored through the International Commission for the Southeast Atlantic Fisheries (ICSEAF).

The reported catches were down somewhat in 1984 (2.1 million tons) compared to the catches from 1981 to 1983 (2.3-2.4 million tons). In contrast to most other fishery regions of the world, a large share of the catches in this area (60%) continue to be taken by distance-water fleets. Pending independence of Namibia, there is no coastal State control over fishing off Namibia beyond territorial waters and Angola has emphasized the development of its small-scale, inshore fishery and not placed many restrictions on foreign fishing vessels.

In this region there is a great contrast between the state of the stocks of the two groups of pelagic fish - the clupeoids (pilchard and anchovy, exploited mainly by the local purse seine fleets) and the horse mackerel (exploited mainly by the large distant-water trawlers). Although the growth of the horse mackerel stocks, whose biomass increased three-fold between 1970 and 1980 has slowed down, the abundance is still high. On the other hand, the pilchard stocks off Namibia and off South Africa are both at a very low level (1984 catch of 101 000 tons), and show no sign of recovery. The anchovy resource, in which there may be an interchange of fish between South Africa and Namibia, shows no sign of expanding to balance the decline in pilchard as has happened in other regions, i.e. change in species composition from a pilchard to anchovy fishery on western coast of North America.

The principal management measure in all the fisheries has been annual catch quotas which are sometimes divided into national allocations. The global quota set for hake off Namibia in 1984 was 429 000 tons. The hake catch in this area has continued to rise with the 1984 catch, double the 1980 catch, but still less than the catches of the 1970's.

Total quotas were set by ICSEAF for chub mackerel and horse mackerel off Namibia (200 000 tons and 630 000 tons in 1984, respectively). The actual catches were 27 000 tons and 602 000 tons in 1984. These quotas are not allocated, and the limitation of the total catch to these figures depends on a somewhat complicated reporting system. The existence of the quota may therefore prevent the catches grossly exceeding the target value, but may be less effective in providing close control. A quota of 34 000 tons has been set for snoek in 1986. In this region as in many others, the regulations are often not being fully complied with and enforced. However, recent information indicate that the rate of infractions has significantly decreased.

WESTERN INDIAN OCEAN (Area 51) (Table 10)

Reported landings continue to rise in this region (2.2 million tons in 1984) due primarily to increased catches of tuna species and small pelagic fish. Still the bulk of the landings consist of the

catches of shrimp trawlers, comprising shrimp and small demersal species, particularly in India and Pakistan. Trawl fishing for cuttlefish, deep sea lobsters and valuable large demersals is mainly done by non-local vessels under joint venture agreements. Fisheries off the East African coast, the island States and in a large part of the Red Sea are mainly limited to the coastal waters and in particular to the coral reefs and beaches. Large-scale fisheries for pelagic species are limited to Southwest India (purse seine for sardinella), the Maldives and Sri Lanka (pole and line for tunas) and to foreign tuna fleets (longline and purse seine since 1983).

Improvements in the reporting on landings by species in recent years in this area have made it possible to present landings by species groups rather than by very large categories. The amount of unidentified and/or poorly identified fish is still some 25% of the total.

Of the 31 countries or territories bordering the Western Indian Ocean and adjacent seas, seven land less than 1 000 tons, eleven between 1 000 and 10 000 tons, while only three countries land more than 100 000 tons. India, with 1.26 million tons, catches more than 50% of the fish taken in the region. The statistics for 1984 are presently available for only 12 countries in the region, the rest are FAO estimates. Improvements in statistical data collection should be noted for the Seychelles, Tanzania and Kenya, where previous landings have been under-reported by 50 to 100%.

Significant declines have been noted in the penaeid shrimp landings in the Persian Gulf since 1979 and these have been the subject of renewed investigation in the last few years. Environmental degradation appears to have played a significant role in recruitment decline in that, although fishing effort levels have generally fallen due to the disturbances in the area, recruitment has shown no dramatic recovery. The situation is still ambiguous however, as long-term data series are not available in most cases. The encouraging experience of Saudi Arabia is noteworthy, where a strictly controlled fleet size is achieving good economic returns.

The artisanal component of the shrimp and finfish fisheries continues to be important in most areas of the Gulf and separate management regulations now exist in most of the Gulf's countries for the two fisheries.

Several new initiatives have been undertaken in the collection of adequate national catch and effort statistics in the Gulf (e.g. Bahrain, Iran), but initiatives to develop a Gulf wide fisheries statistical data base for the Gulf are still at an early stage. This creates a serious obstacle to the assessment of fish stocks exploited in common by several countries.

Some 60% of the local landings in the Red Sea and Gulf of Aden are derived from fishermen using small boats with only Egypt obtaining the bulk of its landings from larger purse seines in the Gulf of Suez. The landings from this area are less than in the past which, in some cases, is probably due to overfishing, but in other instances due to loss of markets and local conflicts. Several recent assessments and surveys have suggested that there are substantial resources available in restricted areas.

Acoustic surveys have indicated the presence of a large mesopelagic fish biomass in particular in the Gulf of Oman and Gulf of Aden, but there is a great deal of uncertainty about the harvesting and marketing aspects of this potential.

In the People's Democratic Republic of Yemen, cuttlefish (Sepia pharaonis), deep-sea lobster (Puerulus sewelli) and rock lobster (Panulirus homarus) have been established as fully exploited along the northern shelf areas; with effort control being applied and cod-end mesh size control being considered in respect to the trawl fishery for cuttlefish.

Survey results off Kenya and Tanzania indicated very low potentials in offshore waters and no or little room for expansion of inshore stocks. The actual potential of Tanzania's shrimp resources remains to be investigated. In Mozambique and probably also off northern Madagascar, considerable pelagic stocks remain to be exploited but the shrimp stocks are probably fully exploited. In the island States the general pattern is that stocks close to the major centres are fully or overexploited, while a potential still exists on distant banks.

The shrimp stocks and inshore demersal fish stocks are fully or overexploited in west India and Pakistan. Some further expansion may exist for offshore small pelagic species, sharks and possibly the deep water demersal species.

The potential large pelagic resources off of northern Somalia remain untapped except for some catches by long range vessels.

Recent estimates of potential yield in several fish stocks have had to be revised downward based on better knowledge of natural mortality rates and a revised application of the Gulland formula. In addition, more attention in the future should be paid to the species composition of biomass estimates and the market value of each component in order to get a better idea of the feasibility of harvesting the stocks.

The Indian Ocean Fishery Commission (IOFC) is the regional organization for the Indian Ocean (Area 51 and Area 57) that assists and coordinates national programmes in fisheries development, promotes regional research activities and examines management problems relating to offshore resources. Special committees are set up for the management of fish stocks in the Gulfs, Southwest Indian Ocean, Bay of Bengal and the Indian Ocean Tuna. These committees have no regulatory powers but act as advisory bodies in the management of the fishery resources in the various countries and in the region. Unfortunately, these committees do not provide for complete coverage of the Indian Ocean at this time. No permanent working groups for the assessment of fish stocks are functioning in this region and to compound the problem, the funding of regional projects supporting these activities is declining rapidly.

EASTERN INDIAN OCEAN (Area 57) (Table 11)

The reported landings in this area continued to increase with the catches from 1980 to 1984 being 1.5, 1.5, 1.6, 1.8 and 1.9 million tons respectively.

Burma only reports total landings and Bangladesh reports just hilsa, crustacea and mixed fish but even these figures are not based on sound statistics. Other countries also report large quantities of miscellaneous fish, consequently only 50% of the total landings from this area are reported by species categories.

The overall landings of shrimp remained stable at 15 000 tons, but there was a sharp drop in Indonesia in 1981, followed by a steep increase, probably caused by the ban on trawling and the subsequent development of other fishing methods. The landings of shrimp in Thailand showed a similar pattern, perhaps due to the reduction of the fishing activities outside Thai waters.

In India the rapid development of a fleet of small trawlers based in major harbours has caused such a decline in catch rates of shrimp that their operation has often become uneconomical. Also the development and rapid introduction of highly efficient high opening trawl gear may cause conflicts with smaller scale fisheries.

Two tiger prawn stocks off Western Australia have shown severely reduced recruitment which has been related to excessive fishing effort. One stock is recovering through area closure, but for the other stock this method could not be applied due to other fisheries.

The lobster, abalone and scallop fisheries of Australia are fully exploited, for the most part, but are well managed by means of closed seasons, limited entry, gear limitation, etc.

Recent bottom trawl surveys in the Bay of Bengal have indicated a limited exploitable resource of fish and shrimp in deeper waters over 100 m. However, the rough configuration of the bottom in some areas and the costs of deep water trawling suggest that other types of gear should be considered for exploiting this resource.

An evaluation of the marine shrimp resource in Burma indicates heavy exploitation of the stocks along the Tenasserim coast while, in contrast, the Rakhine area shows no clear evidence of over exploitation. Suggestions are given for improving the statistical system of catch records and for the collection of biological data. Recent estimates have been made of the biomass of the demersal fish stocks in both Burma and Bangladesh.

Small-scale tuna fisheries, mainly for skipjack and little tuna are still developing in the area, in particular in Indonesia. In India on the other hand catches of this category dropped to 50 percent of the 1980 level.

Demersal fish off Western Australia is to a large extent exploited by foreign pair trawlers. Pelagic resources off South Australia, including jack mackerel, pilchards, snoek and gemfish are underutilized. Prospects for trawl fisheries in this area are not very good, but harvesting of substantial squid resources has recommenced recently in cooperation with other countries.

The assessment and management of fish resources, however, are generally at a low level throughout the region.

The state of the stocks of oceanic tuna fished in this area are covered in the review of the tunas. Information on the Indian Ocean Fishery Commission (IOFC) is covered under Area 51.

NORTHWEST PACIFIC (AREA 61) (TABLE 12)

The marine catch from this area has continued to increase at a rate of 4-12 percent every year for the past decade and reaching about 24 million tons in 1984. The increased catch in 1984 has resulted chiefly from an increase in the catch of the two dominant species; the Alaska pollack with an increase of about 0.9 million tons and Japanese sardine with an increase of 0.7 million tons. They are the reported two largest single species catch in the world. The total catch in 1984 is the highest ever for the area and contains 32 percent of the total world marine catch. The production is also distinct, being supported by the environmental diversity in the area with its well-balanced composition of demersal and pelagic species. This area resembles that of the second highest productive area, the Northeast Atlantic (Area 27), where the annual catch is around 11 million tons per year.

Most countries in the area showed a steady increase in catches except for the Midway Islands. The state of the resources and the fisheries in the western and southern regions of the area cannot be fully assessed because fishery statistics are not available from the DPR of Korea and only incomplete statistics from China.

In the northern region many salmon stocks which have been depleted by overfishing and deterioration of their spawning/nursery rivers, are now showing clear signs of recovery. There has been a remarkable increase in the net return of USSR origin pink salmon (both odd- and even-year classes) and Japanese origin chum salmon. The latter is encouraging as it resulted chiefly from their re-stocking programme. A substantial increase in the total salmon catch is therefore expected in the near future.

Almost all the commercially useful demersal fish stocks in the area are being exploited, and nearly all are being fully exploited or partly overfished.

The continuous high production of Alaska pollack in the northern region, with an annual catch of 3.5 to 4.6 million tons, is a highlight among demersal stocks in the area, and is the highest yield from any one demersal species in the world. The current catch seems to have reached its maximum level and no increase in catch is expected. On the other hand, in the southern region including the Yellow Sea and East China Sea, there is serious overfishing of many demersal stocks. The present abundance of the demersal stocks of commercial value in this region is estimated to be one-fifth to one-tenth of their previous highest levels and there has been no sign of recovery. Overfishing referred to in these cases, may be due to serious losses of post-larvae and juvenile fish to the fishing gears used in the coastal fisheries. Various demersal stocks in the central region, around Japan, have generally been stable throughout the years.

Coastal pelagic fish stocks in the area have shown three marked features; first their very high level of productivity with an annual catch of 3 million to 7 million tons, second the large fluctuations in abundance of many species, and third, as a result, dramatic changes in dominancy from one species to another. These features are most noticeable in the stocks around Japan, involving the Pacific herring, Pacific saury, Japanese sardine, Japanese chub mackerel, Japanese anchovy and Japanese jack mackerel. One example of this has been the dramatic change in the stock abundance of the Japanese sardine. The

catch, which had fallen to only about 9 000 tons around the mid-1960s, now exceeds 5.1 million tons making it the world's largest single species catch. Similar changes have occurred in the other pelagic species in the past, though the magnitude varied.

Clear causes for these changes are unknown however; it has been generally accepted that they are probably natural causes and there is little evidence of a direct link with fishing. In recent years the abundance of Pacific saury has declined moderately and remained at a low level, while Japanese jack mackerel and Pacific herring have seriously declined, and Japanese chub mackerel appears to be in a descending phase, probably related to the recent outburst of the Japanese sardine stocks. In contrast, the fishery for the Japanese anchovy appears to have been fairly constant over the years which may indicate its stability against changes in both the environment and fishing mortality.

The total catch of all pelagic fish in the area in recent years has been 6 million to 8 million tons, however, it is rather doubtful whether this level will be maintained as it is probable near the maximum of a long-term fluctuation. Due to these major changes in relative abundance of the different species, it is difficult to establish long-term sustainable yields for the individual species.

Cephalopods may be the only resources in the area with ample room for increased fishing, although Japanese flying squid and other cephalopod stocks around Japan are fully exploited. The oceanic squids in the northern region together with neritic cephalopods in the southern region could provide substantially larger catches.

Prawn and shrimp stocks in the area have been generally fully exploited and some are overfished. A greater catch is not expected.

The potential yields of the major species groups have been estimated (in thousand tons) at 300-350 for salmon:500-7 000 for demersal fish, 5 800-6 500 for coastal pelagic fish: 280-380 for tunas and billfishes, 950-1 250 for cephalopods, 400-600 for prawns and shrimps, 3 800-3 900 for other fish (current catch level), 1 750-1 850 for other species (current catch level) leading to a total of 19 800-21 830 thousand tons. This implies that the production of more than 90 percent of the estimated potential yield has already been achieved in the area in recent years, even if the recent huge catch of coastal pelagic fish is regarded as an exceptionally large production in a transitional stage.

Japan, the Democratic Popular Republic of Korea, U.S.A. and USSR have extended their national jurisdiction on fishing to 200 miles offshore and have taken managerial responsibility for the major stocks in the northern part of the area. There have been a few bilateral arrangements for fishing by non-coastal fisheries in these waters; the two Fisheries Conventions between Japan and USSR define the management measures for non-coastal fisheries in both jurisdictional waters; Japan-U.S.A. and the Republic of Korea-U.S.A. agreements define the fishing by these two countries in U.S. waters. The Japan-USSR Fisheries Cooperation Convention deals mostly with the Japanese salmon fishery on the high seas for the fishing on USSR origin salmon.

China and the Republic of Korea have not yet extended their jurisdiction on fishing, and Japan, as a result, has not applied her extended jurisdiction to these countries. Under these circumstances, the joint regulatory zones have been established in parts of the Yellow Sea and East China Sea by China-Japan and Japan-Republic of Korea fisheries agreements for managing the shared stocks of both demersal and pelagic species. However, these joint regulatory measures cover only a part of the distribution of the stocks as the major part generally falls in the coastal zone where the national jurisdiction of each country applies.

NORTHEAST PACIFIC (AREA 67) (TABLE 13)

The total catch from this area declined during 1977-80 due to the large reduction in the catch by non-coastal fisheries in conjunction with the extension of the national jurisdiction on fishing by Canada and the U.S.A. Catches have recovered to about 2.4 to 2.7 million tons over the past four years which are greater than the level before 1977. The area is ranked sixth in the major fishing areas in the world accounting for about 3-4 percent of the total world marine catch.

The production from the area is distinct with its high component of demersal fish, 70-75 percent of the total. It is worth noting that the U.S. fishery catch has been steadily increasing, while the Canadian catch has remained fairly constant. The U.S. catch exceeded 1.2 million tons in 1984, accounting for about 47 percent of the total catch. The rapid increase in the U.S. catch was chiefly stimulated by the expansion of joint ventures with Japan, Republic of Korea, Poland and the USSR. In contrast, the catches by the non-coastal countries have continuously declined.

The abundance of major salmon stocks in the area, pink, sockeye and chum salmons, which had substantially increased during the late seventies to early eighties has been fairly stable at a high level during the past four years.

Halibut stocks are the second most important resource for the coastal fisheries in terms of value. They are closed to fishing by non-coastal countries. The stock, depleted during the sixties and early seventies, has been recovering since around 1975. It appears that the juvenile stocks, being supported by a few strong year classes, have further recovered in 1984. The catch-per-unit effort of commercial vessels has markedly increased during the past decade reaching double to triple that of the depleted period. The biomass indices for major exploitable stocks also showed a remarkable increase. This recovery seems to have been derived first, from the preservation of spawning stocks from both the longline and trawl catches and, second, from the protection of juvenile fish against the incidental catch by trawl fishing. It is quite likely that the abundance of the entire stock will recover more rapidly in the near future as these controls are continued.

The abundance of the stock of yellowfin sole in the eastern Bering Sea, which declined during the 1960s, is now at a high level comparable to that before the 1950s. The MSY is estimated to be about 150 000-180 000 tons. The allowable catch, however, has been fixed at a low level of about 120 000 tons to be on the cautious side. The other flatfishes in the area, such as Greenland turbot, arrowtooth flounder, rocksole, flathead sole, Alaska plaice and others, also

appear to have been in good shape in recent years. These stocks seem to have been moderately exploited.

Continuous high production of Alaska pollack is one of the highlights of the area. The total catch has been kept at about 0.9 million to 1.3 million tons in recent years, with the exception of a temporary decline during the late 1970s during the transitional phase to the new regime of the sea. Alaska pollack accounts for about 45-50 percent of the total catch from the area showing both the huge biomass of the stock and importance of both the coastal and non-coastal fisheries. The catch of Alaska pollack by the U.S.A. has rapidly increased to about 0.5 million tons. The stock appears to have been at a high and fairly stable level during recent years. The MSY is estimated to be about 1.2 to 1.6 million tons.

The presence of a large stock of a pelagic form of Alaska pollack has been established in the Aleutian Basin of the Bering Sea by joint research between Japan and the U.S.A. The estimated total biomass of the stock ranges between 1.3 million and 5.5 million tons and inhabits the 30-150 m layer of the sea during their feeding season in the summer. During the spawning season, mid-late February, fish move down to 200-300 m, and concentrate in the southeastern part of the Basin. They are composed mostly of larger and older fish, 38-54 cm body length and 5-7 years old. The relationship between the pelagic and demersal forms of the fish is not known; however, it is likely that they both intermingle during their younger stages on the continental shelf in the eastern Bering Sea. If this is the case, the pelagic stock can be regarded as a reserve spawning stock protected from the fishing mortality on the continental shelf in the eastern Bering Sea.

North Pacific hake and sable fish stocks appear also to be in good condition, however, the allowable catch for each has been set at a low level, as many biological features of these stocks are unknown.

The Pacific Ocean perch stocks were depleted by heavy fishing during the 1960s and have remained at a very low level since then. Due to its specific biological features - extremely slow growth, late maturity with low fecundity and a long span of life, the recovery of the stock would take a long time in spite of several strict management measures having been imposed on the fishery. In fact, a clear recovering trend has not yet been confirmed, although it is more than 10 years after the initiation of such regulations. However, faint indications of increasing abundance have been observed in recent years.

Pacific herring is the only coastal pelagic fish resource being exploited in the area. A full analysis of the state of exploitation has not been carried out; however, it appears that most stocks are in a healthy condition. The recent catch has been substantially lower than before and well below the estimated MSY. This may have been chiefly due to reduced fishing resulting from the stagnant international trading situation, especially for raw herring for the Japanese market.

The area is characterized by its extremely low production of coastal pelagic fish due mainly to the environmental/oceanographic condition. The other pelagic fish which could be harvested in the future probably include Pacific saury (Cololabis saira) and Pacific pomfret (Brana japonica), though the latter tends to be oceanic.

King crabs in the eastern Bering Sea and the northern Gulf of Alaska have been seriously depleted by overfishing during the late 1970s and early 1980s. The catch has drastically declined since 1981 and the fishing fleet has been reduced. This is one of the major reasons why the U.S. joint ventures with non-coastal countries have increased rapidly for catching Alaska pollack. Strict regulatory measures, including the complete closure of major fishing grounds, have been imposed since 1983; however, it would need a lengthy period to restore the resources, as king crab is also a slow growing and late maturing species.

It is considered that Pacific snow crab stocks in the eastern Bering Sea have also been heavily exploited, due partly to a shift of target species from king crab. The catch, which in recent years has been substantially lower than the estimated MSY can be expected to decline further in the immediate future until regulatory measures come into effect.

Pacific Ocean shrimp stocks, mainly (Pandalus spp.), are also reported to have been seriously depleted by overfishing, especially in the Gulf of Alaska. Although adequate assessments of the stocks have not been made, it is believed that the overall abundance of the shrimps would fall precipitously if the major stocks were submitted to heavy fishing. These shrimps are extremely sensitive to heavy fishing, even if it is limited to the larger individuals, due largely to the sex reversal from male to female that occurs near the mid point of their lives.

In the area there are two managerial bodies that have been established for many years; the International Pacific Halibut Commission (IPHC) and the International Pacific Salmon Fisheries Commission (IPSFC). Both the Commissions are composed of Canada and the U.S.A.; the former deals with research into, and management of, Pacific halibut resources in the entire area, while the latter is concerned with the sockeye and pink salmon resources in, and adjacent to, waters of the Fraser River System. The fishing for halibut and salmon in this area by other nations is completely prohibited.

The responsibility for the management of most of the other resources falls, as in other areas, within the national jurisdiction of the coastal countries of Canada and the U.S.A. Fishing by non-coastal countries in these waters has been defined and governed by bilateral agreements established between each of the coastal and non-coastal nations. Agreements with Bulgaria, Federal Republic of Germany, German Democratic Republic, Japan, Republic of Korea, Poland and the USSR were operating in 1984.

The International North Pacific Fisheries Commission (INPFC), which is composed of Canada, Japan and the U.S.A., is not a managerial body in principle, but has played an important role in the implementation of various management measures required by the coastal States. The Commission holds a meeting of the Standing Committee on Biology and Research every year, just prior to their Annual Meeting, when most major resources in the convention area - salmon, groundfish, pelagic fish, crabs, etc., - are assessed. The results of the assessments are then used by the coastal States in deciding on the regulatory measures for the coming fishing season.

WESTERN CENTRAL PACIFIC (AREA 71) (TABLE 14)

The total catch from the area increased gradually during the past ten years and reached about 6.4 million tons in 1984. This is the fourth largest catch among the fishing areas, and accounts for about 8 percent of the world total marine catch. The area, which falls entirely in the tropics, comprises two different environmental regimes; the neritic zone with extensive continental shelves along the western Asian countries in the west, and the oceanic zone with very steep continental slopes and many reefs and atolls round the large number of island countries and along the eastern Asian countries, the northeastern parts of Australia and Papua New Guinea in the east. The number of countries involved in fishing in the area is 27; 22 coastal and island States and 5 non-coastal nations.

Four of the non-coastal fisheries (U.S.A., Japan, Republic of Korea, and Taiwan, Province of China) are almost exclusively engaged in fishing for skipjack and larger tunas. In addition, the USSR has been engaged in some coastal fishing for both demersal and neritic pelagic fish in the western part of the area since 1979. The catch of these non-coastal countries accounts for 6-8 percent of the total catch from the area, while the 14 oceanian island countries catch some 2 percent and the Asian countries about 90 percent.

Thailand, Indonesia, the Philippines and Malaysia have substantially expanded their fisheries during the past ten years; however, the catch by Malaysia has recently levelled off. The catch of finfish by Thailand has also shown a rather stagnant trend. This may indicate the fully exploited status of the resources in the western part of the area. The combined catch of these countries in 1984 reached about 5.3 million tons or about 90 percent of the total Asian catch (1.8 million, 1.5 million, 1.3 million and 0.7 million tons in each country, respectively). These Asian fisheries are characterized by their strong dependence on demersal fish resources by both small-scale (artisanal) and large-scale (industrial) fisheries.

The total demersal fish catch of the area has levelled off at around 630 000-760 000 tons annually since the late 1970s. Most stocks in nearshore waters have already been heavily exploited, with the probable exception of stocks in the northern Arafura Sea. The worst situation is in the inner part of the Gulf of Thailand, which is seriously overfished, followed by the Strait of Malacca, the shallower part of the Java Sea and the inner seas of the central Philippines. A decline in the total catch is expected from these waters if fishing effort is increased further. An increased catch can be expected in the northern Arafura Sea with greater fishing effort.

The demersal fish resources in offshore and deeper waters are not fully exploited, with the exception of the Gulf of Thailand and the central to southern part of the Strait of Malacca. However, the intensification of fishing on these offshore resources has been hampered by the problems of extending the artisanal fisheries to deeper and more distant waters, and by the less productive nature of offshore demersal resources for the industrial fisheries in terms of both the quantity (catch rate) and commercial value. Thus, the small-scale fishery tends to concentrate in the inshore zone and the large-scale fishery invades the shallower waters where serious conflicts arise between these two fisheries accelerating the further deterioration of inshore demersal resources. Greater catches of

demersal fish cannot be expected until there is a reduction in total fishing intensity, size regulations and the seasonal closure of spawning and nursery grounds of the major stocks in the nearshore waters. There is also the need for controlled expansion and/or transfer of fishing effort to offshore waters.

The combined catch of the major small coastal pelagic species (mackerels, round scads, sardines and anchovies) has increased slowly from about 1.1 million to 1.3 million tons during the past decade. The catches of mackerels (Rastrelliger spp.) and anchovies (Stolephorus spp., Engraulidae) have increased by about 20 percent while the catches of round scads (Decapterus spp.) and sardines (Sardinella spp.) have declined.

The increase in the catch of larger coastal pelagic fish (king/Spanish mackerels and smaller tunas) is noteworthy, especially that of coastal tunas, bullet and frigate tunas, kawakawa and longtail tuna. This is due to a change in the fishing mode from fishing on demersal fish to pelagic fish.

Assessment of the state of the pelagic resources of the area is hampered by the lack of adequate statistics, incomplete knowledge of the limits of the considerable number of stocks in the area, and in some cases, uncertain identification of the several species involved. No signs of over-fishing have been detected so far. However, several local stocks of small coastal pelagic fish of commercial value have been fully or nearly fully exploited, e.g. mackerels and round scads in the Strait of Malacca and the inner part of the Gulf of Thailand, round scads in the Philippines and sardines in the Bali Strait. On the other hand, the larger coastal pelagic fish have probably been only slightly to moderately exploited even in the recent years.

Almost all the prawn/shrimp stocks in the Asian waters are heavily or fully fished, with the possible exception of some stocks in the northern Arafura Sea. Catches of many stocks of penaeid shrimps have levelled off at about 240 000-260 000 tons during the past decade. Increases in the catches from these species cannot be expected in the future, and there may be a decline in some due to overfishing. Two problems of the shrimp fisheries are: (a) the large loss of juvenile prawns/shrimps discarded from catches of both aimed and non-aimed fishing, and (b) the large catches of juveniles of commercially valuable finfish which are taken by the coastal shrimp fisheries.

Cephalopods are probably the only major resource for which there is still ample room for increased fishing, with a potential annual catch of several hundred thousand tons. The annual catch has been growing steadily in recent years, but is still around 160 000-190 000 tons. Squids are caught primarily as a by-catch of trawling but the pelagic squids have scarcely been utilized. Dipnet fishing with lights, recently developed in Thailand, is a step in the right direction.

Fishing for octopus has been virtually non-existent in the region. The current catch remains at only several thousand tons, though the potential catch is believed to be substantial. The introduction of suitably aimed fishing methods for catching octopus is needed, and the recent development of the octopus pot-fishing in Australia is encouraging.

The coastal fish resources of Australia and Papua New Guinea, for both demersal and pelagic species, are believed to be somewhat unexploited and greater catches are expected in the future.

The state of the stocks of oceanic tunas fished in this area are covered in the review of the tunas, but mention should be made on the development in the Philippines of fishing for juvenile skipjack and yellowfin by purse seiners using payaos (fish aggregating device) which has expanded very rapidly since around the mid-1970s. An assessment on the implication of this method on the entire stocks is urgently needed.

Many countries in the area have substantial areas of coral reefs. Reef fish are generally of commercial value and very sensitive to heavy fishing. The experiences of the Philippines, Malaysia, and Thailand show that where the coral reefs are located within easy access, the reef fish resources have probably already been fully exploited. Further careful research and monitoring of the reef resources are required.

No multi or bilateral arrangements have been made so far to deal with resources management. The Indo-Pacific Fishery Commission (IPFC) of FAO and the IPFC Committee for the Development and Management of Fisheries in the South China Sea (CDMSCS) cover the geographic area, countries and subjects relevant to the development of fisheries in the area. However, neither the Commission nor the Committee has administrative powers, but only consultative responsibilities. The activities of the IPFC Standing Committee on Resources Research and Development (SCORRAD) are limited to consultation on resource research on rather a global and generalized basis.

EASTERN CENTRAL PACIFIC (Area 77) (Table 15)

After reaching a maximum of 2.7 million tons in 1981, catches dropped to 2.3 million tons in 1982, 1.6 million tons in 1983 and recovered slightly to 2.1 million tons in 1984. The area in general was seriously affected by the 1982-83 "El Niño" phenomenon which was one of the strongest anomalies of its kind in the century. This affected the overall distribution of fish, as well as the local and overall abundance of some key resources such as mackerels, pilchards, anchovies, shrimps, etc., and affected fisheries in the whole area.

One of the fisheries most seriously affected was that for mackerel (Scomber japonicus) off Ecuador. Catches of mackerel reached a maximum catch of 700 000 tons in 1981, then due to the "El Niño" in 1982-83, catches dropped to 280 000 tons in 1982 and to 134 000 tons in 1983, but increased to 350 000 tons in 1984. Apparently the stock of mackerel migrated south during the "El Niño" phenomenon, moving away temporarily from the Ecuadorian fishing grounds.

The total catch of Californian pilchard (Sardinops caerulea) increased from 340 000 in 1981 to 430 000 tons in 1982, but dropped to 380 000 tons in 1983 and 270 000 in 1984. This stock is only being exploited by Mexico, although it can also be found off southern U.S.A. Catches of North Pacific anchovy dropped from a maximum of 424 000 tons in 1981 to 365 000 tons in 1982, and dropped further to 102 000 tons and 135 000 tons in 1983 and 1984 respectively. Most of these catches in 1983 were made by Mexico, since catches by the U.S.A., the only other country exploiting this stock, decreased from 57 000 tons in 1981 to only 8 000 tons in 1984.

Catches of Central Pacific anchoveta (Cetengraulis mysticetus), taken mainly by Panama and Ecuador, continue to fluctuate. After reaching a maximum of 172 000 tons in 1980, catches dropped to 110 000 tons in 1981 and 77 000 tons in 1982, to increase again to 160 000 tons in 1983 and 190 000 tons in 1984. Catches of unidentified fish, reaching a maximum of 300 000 tons in 1981, dropped to 170 000 tons in 1982, 46 000 tons in 1983 to go up again to 120 000 tons in 1984. Most of these catches of unidentified fish were reported by Mexico.

Catches of tuna also dropped slightly in 1982-84. Catches of skipjack tuna (Katsuwonus pelamis) were down to 78 000 tons in 1984 after being 147 000 tons in 1981. Catches of yellowfin tuna (Thunnus albacares) also went down from 167 000 tons in 1981 to 150 000 tons in 1984.

Exploitation of the squat lobster (Pleuroncodes planiceps) was also reduced after reaching 14 000 tons in 1981. Catches were reduced to 7 000 tons in 1982 and to 1 800 tons in 1984.

There are no FAO regional bodies in the area. At the moment research and management of tuna in the area is coordinated by the Inter-American Tropical Tuna Commission (I-ATTC) based in La Jolla, but not all the countries in the area are members of this body. Regional cooperation for fisheries research in the area is being promoted by FAO and the Organización Latinoamericana para el Desarrollo de la Pesca (OLDEPESCA) within the framework of a joint working group on fisheries research for Central America and Panama, of which Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama are members. In the south of Area 77, Ecuador and Colombia cooperate in fisheries and other marine research and conservation issues within the framework of the Comisión Permanente del Pacifico Sur (CPPS), of which Chile and Peru (Area 87) are also members.

SOUTHWEST PACIFIC (Area 81) (Table 16)

This area includes New Zealand, a few island communities and a large area of deep open ocean. Most of the fishing is done in the vicinity of New Zealand by New Zealand boats and by vessels from Japan, the USSR and the Republic of Korea. Total catches for Area 81 have continued their upward trend since 1980 (3% annual increase) and reached 454 000 tons in 1984.

Catches of coastal demersal fishes round New Zealand have stabilized over the past few years in spite of increased fishing effort, indicating that the major demersal stocks are fully exploited; however, the statistics on catch and effort are considered inadequate to make satisfactory stock assessments.

Catches of small pelagic species in the area have been increasing steadily and reached 46 000 tons in 1984. These stocks are probably lightly exploited and catches could be increased.

The New Zealand Fishing Industry Board is responsible for the management of fisheries under New Zealand jurisdiction, and largely through a licensing policy has been able to stabilize the fisheries of rock lobsters and of oysters at good economic levels; however, scallops are considered to be severely overfished. Landings of rock lobsters were up in 1984 over the landings in 1983; the average catch per day remaining relatively constant at 64-66 kg per day since 1981.

The total oyster catch was down slightly in 1984. The Board has also established a management policy for deep-water fisheries. Foreign vessels are licensed and given allocations of finfish and of squid that may be caught. This seems to be working satisfactorily.

Skipjack and albacore are lightly fished in the area and catches could be substantially increased.

Although cephalopods at present come second in importance in the area, with a catch of 95 000 tons in 1984, they probably are one of the stocks capable of considerably increased catches, with up to 40 000 tons in coastal waters and substantially more in oceanic waters.

SOUTHEAST PACIFIC (Area 87) (Table 17)

Catches in this area were seriously affected by the 1982-83 "El Niño" phenomenon but have since recovered. Total catches from 1980 to 1984 were 6.2, 6.8, 7.9, 6.3 and 8.2 million tons respectively. The reported catches in 1984 were the highest in the region since 1971.

The sardine (Sardinops sagax) fishery continues to be the biggest fishery in the area. Catches declined from 1980 to 1981 but have increased annually since 1981 reaching 5 million tons in 1984. This stock seems to be fully exploited.

Jack mackerel is the second species of importance in terms of total catch by weight. The stock has been growing and apparently is now bigger in terms of total biomass than the sardine stock. Recorded catches of jack mackerel from 1980 to 1984 were 1.3, 1.7, 2.2, 1.7, and 2.3 million tons respectively. This stock was exploited inshore in 1984 by Chile (1 426 000 tons) and Peru (200 000 tons) and offshore by long-range fleets from the USSR, Cuba, Poland and Bulgaria. Most of the offshore catches are made by Soviet fleets (570 000 tons in 1984). This stock is moderately exploited.

The overall abundance of anchoveta, once the main fishery in the region, continued to decrease, particularly after the latest "El Niño". Catches of anchovy increased to 1.8 million tons in 1982, but this was due mainly to changes in distribution pattern induced by the onset of the "El Niño". Total catches dropped to 126 000 tons in 1983, and to 88 000 tons in 1984 which is the lowest level ever recorded since the anchoveta fishery started more than 30 years ago. The total biomass of anchoveta was reported to be less than 1 million tons in 1983 after the "El Niño" but there are some signs of recovery in 1985. Most of the catches of anchoveta are made by Peru.

Another species of major importance is mackerel (Scomber japonicus) which is being exploited inshore by Peruvian and Chilean fleets and offshore by Soviet fleets and to a lesser extent by Cuba, Bulgaria and Poland. Catches of mackerel were above 200 000 tons until 1980, and then dropped to 176 000 tons in 1981, 84 000 tons in 1982, 33 000 tons in 1983, and went up again to 215 000 tons in 1984.

The four pelagic species mentioned above make up more than 90% of the total catch in this area. The main demersal stock being exploited in the area is hake (Merluccius gayi) which has two stocks - one off Central Chile and the other off Northern Peru. After a period of great fluctuation, catches of hake have dropped from 1980 to 1984, going from 191 to 103, 53, 30, 44 thousand tons respectively. The

country most seriously affected by this recent drop in catches was Peru; its catches dropped from 160 000 tons in 1980 to 4 400 tons in 1983. The exploitation rate of this stock has been fluctuating over the past few years and it has probably gone through periods of heavy exploitation in the past. The hake fishery was also affected by the "El Niño", particularly off Peru where there was an increase in the availability of Penaeus shrimps (catches went from 600 tons in 1981 to 2 100 tons in 1982, 11 000 tons in 1983, to drop to 2 000 tons in 1984) which caused a shift of part of the fishing effort from hake to shrimp. It is foreseen that catches of hake can continue to increase in the near future.

Other demersal species of importance in the southern part are the Patagonian hake (Merluccius polylepis), with a total catch of 32 000 tons in 1984, and Patagonian grenadier (Macruronus magellanicus) with a total catch of 27 000 tons in 1984. Catches of cusk eels (Genypterus spp.) are stable at around 10 000 tons a year since 1979. Catches of South Pacific breams (Seriolella spp.) increased from 24 000 tons in 1981 to 32 000 tons in 1982, dropped to 8 000 tons in 1983 and increased slightly to 14 000 tons in 1984. Catches of Chilean sprat went from 46 000 tons in 1982 to 19 000 tons in 1983 but recovered to 38 000 tons in 1984.

Catches of Eastern Pacific bonito (Sarda chiliensis) continued to increase steadily off of both Peru and Chile, from 7 000 tons in 1978 to 28 000 tons in 1984. Fishing for squat lobster off Chile has recovered slightly to 15 000 tons in 1983 and 1984 after a severe drop to 3 400 tons in 1980.

Catches of squids increased slightly in 1983, but dropped in 1984. Current catches of this stock are still well below the potential yield which is estimated at a few hundred thousand tons, although it should be noted that this is subject to a high variability. Saury also seems to be abundant in the region, but attempts to exploit them have not been promising.

There are two regional bodies in this area that are active in fishery matters: the Permanent Commission for the Southeast Pacific (CPPS) which moved its headquarters to Bogota, Colombia for the next 4 years, and the newly created Organización Latinoamericana para el Desarrollo de la Pesca (OLDEPESCA) with headquarters in Lima, Peru, which replaced the Action Committee for Marine and Inland Water Products of the Latin American Economic System (CAPMAD-SELA).

The CPPS was established in 1952: its members are Chile, Peru, Ecuador, and Colombia. This body deals with marine aspects in general, and has been active in promoting regional cooperation in research and monitoring of fisheries and of fishery-related environmental studies such as the "El Niño". OLDEPESCA has the task of promoting the development of fisheries in the region, and most Latin American countries are in the process of joining it. CAPMAD-SELA was instrumental in the execution of a regional project to assess the stocks of sardine, jack mackerel and mackerel in the Southeast Pacific. This project was partially funded by IDB and had the active participation of Chile, Peru and Ecuador. This project started in September 1981 and ended in June 1984. Efforts are now being made for an extension.

SOUTHERN OCEANS (Areas 48, 58 and 88) (Table 18)

The main fishing areas in this region are confined to the waters around the islands of Kerguelen in the Indian Ocean and around the islands of South Georgia and South Orkney in the Atlantic Ocean. Catches of fish from the Southern Oceans were 74 000 tons in 1984-85, down from the 133 000 tons reported in 1983-84 and 197 000 tons in 1982-83.

The major catch of finfish belongs to two endemic families: Nototheniidae (Antarctic cod) and Channichthyidae (Icefish). Catches of other finfish are very low. The catches of finfish in 1984-85 are 17 percent of the reported finfish catch of 430 000 tons of largely Antarctic cod that was harvested from the accumulated virgin stocks at the start of the fishery in 1969-70. During the intervening 14 years the fishery has switched from one species to another and in the last four years the Antarctic icefish (Champsocephalus gunnari) has dominated the catch. However, catches of this species have declined to their lowest level in the past five years.

The Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) has collected catch and effort statistics for the major fisheries and concluded, based on their assessment, that the stocks of Antarctic cod (N. rossii) are severely depleted and the stocks of icefish (C. gunnari) are heavily exploited. CCAMLR made several management recommendations which will become binding on all members in 1985-86 and include the prohibition of fishing within 12 nm of the coast of the major fishing areas, minimum mesh sizes and no directed fishing for N. rossii.

The French authorities have set a number of regulations for the fishery around the Keguelen area. Some of these have been in force since 1980 and include requirements for fishing licenses, closed areas and closed seasons, TAC (Total Allowable Catch), and fishing inspection of vessels. These management measures have provided some evidence of a recovery of N. rossii in the area.

Commercial fishing for krill started in 1973-74 with the major catches taken in the South Orkney and South Georgia areas. The catches of krill over the five years since 1980-81 have been 448, 529, 229, 129 and 192 thousand tons respectively, probably reflecting the demand for krill. Several nations have reported recent success in preparing peeled krill products and, as a result, the reported catch in 1985-86 has gone up to 430 000 tons.

The status of the krill stocks is unknown and CCAMLR has made no attempt to make an assessment. The krill stocks are likely underexploited. Estimates of krill biomass range from 10 to 700 million tons with estimates of possible annual catches widely varying from0.5 million to several billion tons. Krill research programmes are being conducted but the scientific basis for a meaningful assessment of the stocks is not yet available.

The potential for the squid stocks is unknown and they have been relatively unexploited.

OCEANIC TUNAS AND BILLFISHES (Table 19)

Total catches of all species of tunas including small tunas and seerfishes have increased from 2.6 million tons in 1980 to 3.1 million tons in 1984. Half of this increase comes from increased catches of small tunalike fish caught by artisanal fisheries in South East Asia. This fishery reached 979 thousand tons in 1984, a 40 percent increase over 1980.

The total catch of oceanic tuna increased by 13 percent between the years 1980 and 1984 from 1 903 to 2 153 thousand tons. Significant changes have been observed over the last four years in the world tuna fishing industry due to the declining price of fish, especially for those processed in canneries (skipjack and yellowfin) and the increased difficulties in the access to fishing grounds due to the extension of economic exclusives zones. While 75 percent of total catches of oceanic tunas and billfishes were made by six traditional tuna fishing nations in 1980 (Japan, U.S.A., Spain, France, Taiwan (P. of China) and Korea), the share by those countries had declined to 69 percent in 1984. Catches made by other countries, almost all developing countries, have increased by 40 percent between 1980 and 1984.

The distribution of the catches has changed notably in 1983 and 1984, with catch increases in the Western Pacific and the Indian Ocean due to the shift of large purse seine fleets from the Atlantic and the Eastern Pacific. While fishing effort by those fleets remain high in the Indian Ocean in 1984 and 1985, some vessels begin to move back from the Western to the Eastern Pacific. In 1985, this movement increased particularly in the Pacific as the yellowfin stocks in the Eastern Pacific were recovering after two years of relatively low fishing pressure. Such a recovery of the yellowfin stock is also observed in the Eastern Atlantic.

The distribution of the catches among the major fishing methods is continuously changing. Pole and line and longline fishing have been reduced since 1981, while purse seining is increasing. This resulted in an increase in catches of small yellowfin and skipjack, while catches of big yellowfin, albacore and billfishes remain stable despite the moderate decrease of fishing effort by the longline fleets.

Six countries have dominated the canned tuna market up to the late seventies. The U.S.A., the major consumer country, processed 51 percent of the canned tuna in 1979 and Japan, Italy, France and Spain together processed 37 percent. All those countries are very active in purse seine fishing, except for Italy which imported most of its tuna (92 000 tons in 1985). Italy has been able to take advantage of the low price of tuna in the last few years and has substantially increased their canned production.

The share of developing countries in the production of canned tuna has increased as well. The quantity processed by those countries has quadrupled since 1979, reached 288 000 tons in 1984 or 31 percent of the total. The largest companies, such as Starkist and Vancamp, have transferred their canneries near the major fishing grounds in territories with low labour costs. Plants have been located in American Samoa and in Puerto Rico. The share of canned tuna processed in developing countries reached 65 percent in 1984 if we take into account fish processed in those two territories.

In recent years, canned tuna production by Thailand has increased from 8 000 tons in 1981 to 84 000 tons in 1985 making this country the third largest producer after U.S.A. and Japan. Production of canned tuna is also increasing in such countries as Mexico, Venezuela, Solomon Islands and numerous projects are being developed in other developing countries.

The specialized Japanese Sashimi market continues to attract a lot of attention because of extremely high prices. However, it is limited in size and requires that the fish be handled and stored very carefully. As a result, fishing effort on the major species in this market (mostly bigeye and bluefin) has remained very intense.

The expansion of fishing effort in the Southwest Pacific Ocean has been accompanied by steady increases in production. In 1984 the total catch in the Pacific Island region was estimated to be 630 000 tons. Yet major tuna resources in the region generally appear to be in good condition, and their fisheries appear viable from a biological point of view. The skipjack stock has so far been only lightly exploited and could sustain a much higher fishing effort. The yellowfin stock also appears to be in good condition, though there are indications from both the longline and purse seine fisheries that the population is beginning to respond to fishing pressures. The longline fishery for bigeye continues to show high catch rates, and continued growth in this fishery is expected. The longline fishery for albacore appears to be nearly fully exploited but there is a possibility of increased yields from the Southern surface troll fishery.

In the Eastern Pacific Ocean the 1985 catch of skipjack was among the lowest in recent years. This was not necessarily due to lesser abundance, rather the demand for skipjack was low and the vessels tended to avoid the areas where skipjack were predominant. Yellowfin is now at its highest level of abundance since the early 1980s and could withstand higher catches during 1986, providing the stock size is not reduced by overfishing. Skipjack can also sustain increased fishing effort while bigeye can probably continue to be exploited at current levels.

In the Eastern Atlantic, yellowfin catch decreased sharply in 1984 as part of the purse seine fleet moved to the Indian Ocean because of the very low catch rates obtained in previous years. Fishing effort decreased by 24 percent in 1984 with the stock recovering somewhat. This allowed for a 20 percent of increase in the 1985 catch rate. The catch per unit effort indices for skipjack has not shown a uniform decrease and it is likely that the population is not fully exploited. The Atlantic bigeye catch has been increasing gradually since 1970 and it is generally believed that the fishery has been operating at a level close to the MSY. Fishing effort and landings for albacore have decreased substantially over the past years. A marked drop in landings was noted for troller and baitboats fishing, while longline catches declined slightly due to a shift in the fishery from the North to South Atlantic. Stock analysis of bluefin tuna is very difficult due to the fact that many countries are under reporting their catch in the East Atlantic and the Mediterranean as well as in the West Atlantic. In the West Atlantic catches of skipjack and yellowfin are somewhat stabilized after a growth phase in 1982-1983.

Total tuna production in the Indian Ocean has been less than that in the Pacific and Atlantic oceans, but the importance of the fishery has grown rapidly in recent years. Production of tuna and tunalike species increased from 200 000-300 000 tons prior to 1981, 380 000 tons in 1983, and over 450 000 tons in 1984 and 1985.

The relatively healthy situation in many tuna stocks in the Pacific, Atlantic and Indian Oceans is the result of natural circumstance (i.e. a better distribution of fishing effort), rather than the result of conservation efforts by man. If the fishing effort continues to increase, some sort of control will however, need to be implemented.

As a result of extended jurisdiction, it has been extremely difficult in the last few years for tuna scientists to gain access to detailed catch and effort statistics for stock assessment, particularly in the Western Pacific. Governments as well as tuna companies are often reluctant to release detailed catch and effort statistics because of the use that could be made of this information, e.g., in access negotiations.

At the same time, there is an increasing need to monitor the tuna stocks of the Pacific and to conduct fish stock assessments since the present situation suggests that some complex fishery interactions are taking place, i.e., interaction between purse seine and longline fisheries, effects of the tremendous increase in catches of the juveniles of yellowfin and skipjack with the development of purse seine fishing on fish aggregating devices and logs, etc. The FAO/UNDP Indo Pacific Tuna Management and Development Programme (IPTP) is addressing some of these issues.

International cooperation in tuna management takes place through several Commissions such as the Indian Ocean Fishery Commission (IOFC), Indo-Pacific Fishery Commission (IPFC), International Commission for the Conservation of Atlantic Tunas (ICCAT), Inter-American Tropical Tuna Commission (I-ATTC).

In the Indian Ocean and the Western Pacific, the IOFC Committee on Management of Indian Ocean Tuna and the IPFC special Committee on Management of Indo-Pacific Tuna are responsible for reviewing the state of the stocks and the measures that might be considered for management and development planning of the tuna fisheries.

In the Southwest Pacific, stock assessments are also carried out by the South Pacific Commission, while the South Pacific Forum Fisheries Agency has been set up to advise its member countries on a wide range of technical and policy matters related to the use and management of the resources in the region. It also facilitated the harmonization of regimes and has established a registry of foreign vessels fishing in the region for tuna.

In the Eastern Pacific, I-ATCC reviewed the status of the "Eastern Pacific Ocean Tuna Fishing Agreement". The new agreement initially signed by Costa Rica, Panama and the USA in 1983 is now in the process of ratification and will become effective when at least five coastal states have ratified it.

The new law of the sea regime has drastically changed the nature of the responsibilities and powers of the existing Commissions. As a result, relatively little attention has been given to immediate

questions of management or of new assessments of the stocks. There are exceptions. In the Northwest Atlantic, continued concern has been expressed about the state of the bluefin tuna which, because of its potentially long life span and vulnerability to a succession of fisheries over most of its life, is more susceptible to overexploitation than the other species of tuna. Controls on the catch of these species have been negotiated between Japan and the U.S.A.

Apart from these Commissions, continued monitoring may also be carried out for some heavily fished stocks within direct agreement between the fishing countries, i.e., assessment of Northern Pacific albacore (U.S.A. and Japan) and southern bluefin tuna (Australia, Japan, New Zealand).

The results of the very extensive tagging experiments carried out in the Southwest Pacific are now becoming available. It appears that the stock in the area is very large, though exact quantitative interpretation of the results is difficult. Although some fish moved over long distances, the great majority of fish were recaptured in the exclusive economic zone of the same country as that in which they were tagged. This suggests that for this specific species, events in one exclusive economic zone do not greatly influence those in others, and that, for resources management purposes, it is desirable, but not essential, that measures taken by one country be coordinated with those taken by others.

For most of the other species and particularly for the Pacific Ocean, international collaboration will remain necessary to study the complex sets of interactions occurring between fishing gears or between the bordering areas.

C. REGIONAL REVIEWS OF INLAND WATER RESOURCES

Clear estimates of the quantity of fish produced from inland waters and aquaculture are hard to obtain because of the different manner of reporting these items in various countries, the differing, degrees of coverage and because of the importance of subsistance catch which is usually not covered at all. Estimates of aquaculture production often include fish from brackish and marine sources and may include all production from reservoirs, even where the only contribution from culture is stocking. Furthermore, yields from inland capture fisheries are not always separated in their entirety from reared fish. Thus, despite a trend to increasing catch from inland waters in all continents, it is not clear whether this is due to an expansion of aquaculture or to an improvement in the management of the fresh waters and their fisheries.

The history of catches of fish from the inland waters of the various continents of the world is given in the table below, which shows that there has been an overall increase in production of some 38 percent over the seven years under review.

Production of fish by inland fisheries
and aquaculture for the various continents (1978-84)
based on nominal catch statistics

Continent	Catch ('000 t)						
	1978	1979	1980	1981	1982	1983	1984
Africa	1417	1416	1383	1371	1439	1511	1507
America, North	140	130	146	151	162	243	258
America, South	272	221	280	294	315	320	321
Asia	4170	4349	4672	5145	5336	5861	6340
Europe	305	314	365	366	395	393	398
Oceania	2	2	2	2	4	5	8
USSR	727	806	753	808	804	797	881
TOTAL	7034	7239	7603	8138	8454	9131	9713

AFRICA (Area 01)

Catches in Africa declined slightly from 1978 to 1981 but have risen over the last several years. This seeming stability conceals a series of shifts within the continent. Theoretical calculations of potential fish yield from the inland waters of the continent predict possible yields of the order of 3.4 to 3.9 million tons. In fact, however, it is doubtful whether this level of production can ever be attained although there are still several fisheries which, because of their isolation or for socio-economic reasons, still remain little utilized. These include the Okavango swamps, the central swamp systems of the Congo/Zaire River, the Ethiopian rift valley lakes and the pelagic resources of Lake Tanganyika.

There has been a serious depletion of fish stocks in many parts of Africa due to change in the climate. This has been particularly marked in the Sahelian zone where Chad, Niger, Mali and Senegal have been the most affected with the virtual cessation of the floods of the Niger, Senegal, Logone and Chari Rivers and with the continued desiccation of Lake Chad although better rainfall in 1985 and 1986 has produced some rapid recovery. The other significant changes in capture of fisheries have resulted from some species transfers. The introduction of Nile perch (Lates niloticus) into Lake Kyoga in Uganda has resulted in the conversion of this previously highly productive multi-species fishery into one based upon three-species only with a resulting long-term drop in catch. The fisheries of Lake Victoria appear to be following a similar history, with the introduced predator increasingly dominating the catch but is still increasing as part of the early phase of predatory expansion. The history of Lake Kivu following the transfer of Limnothrissa miodon from Lake Tanganyika has resulted in the creation of a new fishery of modest yield. Lake Karibi has had a successful fishery for this species for some time and a similar successful fishery has developed downstream in Cobora Bassa Lake.

NORTH AMERICA (Area 02)

Catches have remained stable throughout much of the North American area over a considerable period. In the U.S.A. and Canada emphasis on commercial catches is relatively low and the resources are utilized mainly for recreation. Recent attempts at improving the quality of the environment for fish, and particularly efforts to reconstruct the salmonid fauna of the Great Lakes should eventually raise the potential from these waters. Production from the inland waters of Mexico has increased considerably over the period under review. Much of this apparent increase may be the result of better statistics but there is no doubt that there has been increased attention to inland fisheries. Furthermore, there has been a considerable expansion in the aquaculture sector during the same period. More central American countries are taking a close look at aquaculture practices in the small and medium reservoirs throughout the region. Intensification of aquaculture and improvement in the management of small dams accounts for the three fold increase of inland fish production in Cuba.

SOUTH AMERICA (Area 03)

Catches of fish from the inland waters of South America continue to increase because of the rising emphasis on fish as a relatively cheap source of animal protein. There have been further expansions of the fisheries of the Amazon, Orinoco and Paraná basins although some of the older fisheries such as those of the Magdalena River in Colombia have declined due to pollution and other environmental pressures. The creation of many new dams and impoundments throughout the continent has also increased the potential for fish production.

Despite these recent increases in catch, the actual production from the continent remains very low when compared with the estimated potential of about 1 500 000 tons from capture fisheries in lakes, rivers and coastal lagoons. Some of the shortfall is probably due to poor recording of data, particularly on the subsistence and artisanal sectors of the fishery, although there is no doubt that local food preferences have resulted in the neglect of fisheries resources until recently.

ASIA AND THE PACIFIC (Areas 04 and 06)

Asia continues to produce the majority of fish of freshwater origin, about 65 percent of the world total. This is mainly due to the widespread adoption of aquaculture as natural inland water resources are confined to the major rivers and very few natural lakes. The resource base for capture fisheries has continued to enlarge through the creation of dams and reservoirs but some deterioration of the aquatic environment has been occurring through urbanization, industrialization and intensive farming. Capture fisheries, however, are insufficient to account for the increase in catch of over 2 million tons recorded over the last seven years. Four countries in particular, China, India, Indonesia and the Philippines have continued growth of inland fisheries throughout the period under review mainly through the expansion of aquaculture.

EUROPE AND USSR (Areas 05 and 07)

Production of fish from the inland waters of Europe and the USSR has risen by about 25 percent over the seven years listed in the table on page 36. Western European fisheries have increased mainly because of a rapid increase in aquaculture in some countries. Increases in production have also been recorded from the countries of the Danube basin, where changes in the regime of the river, the creation of reservoirs and extensive aquaculture in the old floodplain water bodies all contribute to higher catches.

D. AQUACULTURE (FRESHWATER, BRACKISH AND MARINE)

The following table gives the reported production of aquaculture since 1975. The figures given include marine and freshwater finfish, shellfish and crustacea but exclude seaweeds. Those given for Africa and L. America are very incomplete and reported differently in the various years.

Reported ('000 tons) of aquaculture production
for freshwater and marine finfish, molluscs and crustacea

	1975	1980	1983
Africa	107	4	4
America N.	158	140	316
America L. + Caribbean	97	71	219
Asia & Pacific	3720	5135	6250
Europe & USSR	892	1141	1278
Total	4974	6491	8107

N.B. 1984 data unavailable at this time.

It is difficult to gauge the precise contribution of aquaculture to the inland statistics but there is no doubt that in Asia and Europe such increases have occurred primarily through cultured fish. An effort is now being made to collect aquaculture statistics on a regular basis in the same way as catch and landing statistics are obtained.

Table 1

Annual world landings of aquatic resources (million tons)
(excluding mammals and seaweeds)

	1948-52	1953-57	1958-62	1963-67	1968-72	1973-78	1979	1980	1981	1982	1983	1984	1985
Total: All species	**21.9**	**29.0**	**39.8**	**53.9**	**67.1**	**68.2**	**71.0**	**72.0**	**74.8**	**76.6**	**76.8**	**82.8**	**85.0**
Inland waters	2.5	3.8	5.8	7.3	8.9	7.1	7.2	7.6	8.1	8.5	9.1	9.7	10
Anchoveta	0.0	0.1	3.7	9.0	10.0	2.8	1.4	0.8	1.6	1.8	0.1	0.1	1.0
Marine: less anchoveta	19.4	25.1	30.3	37.6	48.2	58.3	62.4	63.6	65.1	66.3	67.6	73.0	74

Table 2

Catches ('000 tons) by local and long-range fleets in selected regions
in which fishing by countries outside the region is particularly important

Area	1970-74		1975-79		1980		1981		1982		1983		1984	
	Local	Long Range	Local	Long Range	Local	Long Range	Local	Long Range	Local	Long Range	Local	Long Range	Local	Long Range
NW Atlantic	**2014.5**	**2209.0**	**2125.8**	**1040.2**	**2560.3**	**307.8**	**2537.1**	**291.8**	**2508.2**	**305.5**	**2457.6**	**263.2**	**2346.5**	**325.0**
% of total area catch	47.7	52.3	67.1	32.9	89.3	10.7	89.7	10.3	89.1	10.9	90.3	9.7	87.8	12.2
EC Atlantic	**1144.5**	**1935.4**	**1268.9**	**2108.6**	**1276.8**	**2152.5**	**1377.1**	**1854.2**	**1403.2**	**1796.5**	**1482.4**	**1582.1**	**1358.6**	**1246.6**
% of total area catch	37.2	62.8	37.6	62.4	37.4	62.8	42.6	57.4	43.9	56.1	48.4	51.6	52.1	47.9
SE Atlantic	**1710.8**	**1039.8**	**1212.0**	**1538.9**	**927.3**	**1244.9**	**982.0**	**1410.4**	**921.7**	**1437.5**	**1035.9**	**1290.3**	**819.8**	**1336.9**
% of total area catch	62.2	37.8	44.1	55.9	42.7	57.3	41.0	59.0	39.1	60.9	44.5	55.5	38.0	62.0
NE Pacific	**509.7**	**1882.3**	**651.0**	**1407.3**	**856.4**	**1118.3**	**992.3**	**1381.0**	**1006.2**	**1154.0**	**1211.6**	**1201.9**	**1459.4**	**1227.2**
% of total area catch	21.3	78.7	31.6	68.4	43.4	56.6	41.8	58.2	46.6	53.4	50.2	49.8	54.3	45.7

Table 3

Northwest Atlantic (Area 21)

Stock	Estimated potential ('000 t)	Main fishing countries (1983)	Catches ('000 t) 1970-74	1975-79	1980	1981	1982	1983	1984	State of Exploitation
Atlantic cod	1350-1750 Greenland,	Canada, France, Spain, USA	972	538	598	617	704	701	607	Recovering
Red hake	50-100	USA, USSR	45	15	3	3	3	3	3	Fully exploited
Haddock	100-130	Canada, USA	35	42	80	83	67	55	49	Depleted
Saithe (=Pollock)	40-100	Canada, USA	34	43	56	58	54	48	54	Fully exploited
Silver hake	250	Cuba, USA, USSR	270	136	62	62	80	54	96	Fully exploited
Roundnose grenadier	30-100	Germany D.R., USSR	42	24	4	7	4	4	4	Moderately exploited
Atlantic redfishes	200	Canada, USSR	267	165	117	130	125	118	123	Fully exploited
Flatfishes	250-300	Canada, USA	284	238	231	216	210	207	194	Fully exploited
Other groundfish		Canada, USA	137	118	107	99	90	86	86	Moderately exploited
Capelin	500(?)	Canada, USSR	130	217	27	39	42	42	60	Depleted
Atlantic herring	300-1000	Canada, USA	612	320	260	224	180	166	159	Depleted
Atlantic menhaden	500*	USA	273	267	332	263	311	336	325	Fully exploited
Atlantic mackerel	0-400	Canada, Poland, USA	354	133	25	28	30	29	33	Underexploited
Other fish		Canada, Italy, USA	139	90	65	55	58	47	68	
Total fish	**3870-5630**		**3595**	**2346**	**1967**	**1884**	**1958**	**1892**	**1861**	
Crabs	Unknown	Canada, USA	46	50	72	97	106	97	101	Some stocks underexploited
American lobster	30	Canada, USA	30	33	37	39	41	48	48	Overexploited
Northern prawn	40	Greenland	12	41	45	41	43	45	34	Fully exploited
Other shrimp		Canada	13	9	13	16	13	14	15	Fully exploited
Total crustaceans			**101**	**133**	**167**	**193**	**203**	**204**	**198**	
American cupped oyster	Unknown	Canada, USA	173	146	156	156	118	78	83	Environmental impacts
Scallops	Unknown	Canada, USA	73	182	180	190	147	135	106	Overexploited
Clams	Unknown	USA	231	232	277	325	308	338	378	Fully exploited
Squids	Unknown	Canada, Japan, Spain	44	117	111	69	49	38	27	Moderately exploited
Other molluscs			6	9	8	10	18	23	18	
Total molluscs			**527**	**686**	**732**	**750**	**640**	**612**	**612**	
Others			1	1	1	1	1	1	1	
Total area			**4224**	**3166**	**2867**	**2828**	**2802**	**2709**	**2672**	

* Part of stock occupies Western Central Atlantic (Area 31)

Management measures. All important stocks are covered by catch quotas divided among countries fishing in the region. These quotas are set by the coastal state (Canada, USA and the European Economic Community) for waters within 200 miles and by the North Atlantic Fisheries Organization (NAFO) for waters beyond national jurisdiction. In addition to quotas, there are controls on effort, gear, area and reason for various fisheries.

Note: The main fishing countries are listed in alphabetical order in this and the following tables.

Table 4

Northeast Atlantic (Area 27)

Species	Main fishing countries (1984)	Estimated potential[a/] ('000 t)	Catches ('000 t)							State of exploitation
			1965	1970-1974	1975-1979	1980	1981	1982	1983	1984	
Freshwater and diadromous	Finland, USSR	Unknown	57	56	45	51	48	47	46	40	Unknown
Plaice	Denmark, Netherlands, UK	150	144	183	167	145	134	151	147	160	Fully/over exploited
Common sole	Netherlands	20-25	26	31	23	26	25	31	31	30	Fully/over exploited
Other flatfish	Denmark, France, Iceland, Netherlands Spain	150	129	159	127	139	128	156	164	152	Fully exploited
Tusk	Norway	Unknown	38	32	34	49	39	41	41	41	Unknown
Atlantic cod	Denmark, Iceland, Norway, Poland, USSR	1,500-2,000	1,300	1,831	1,714	1,613	1,729	1,552	1,373	1,362	Fully/over exploited
Lings	France, Norway, Iceland	Unknown	60	68	73	93	80	81	84	84	Unknown
Haddock	Denmark, Iceland Norway, UK	400	499	601	385	296	334	356	314	261	Fully/over exploited
Saithe (Pollock)	France, Iceland, Norway	700	370	638	537	377	421	457	443	493	Fully/over exploited
Polar cod	USSR	Unknown	-	193	18	-	9	90	37	6	Unknown
Norway pout	Denmark, Norway	Unknown	77	523	540	581	346	533	548	491	Unknown
Blue whiting (Poutassou)	Denmark, Norway, USSR	Unknown	18	41	407	1,106	888	527	523	598	Moderately to fully exploited
Whiting	Denmark, France, UK	200-300	183	204	218	190	192	179	163	162	Fully/over exploited
European hake	France, Spain	100-150	123	97	76	64	63	59	66	78	Fully exploited
Other gadoids	France, Spain, USSR	Unknown	50	39	52	63	49	51	54	46	Unknown
Sandeels	Denmark, Norway, UK	500	141	358	643	769	653	660	592	731	Fully exploited
Atlantic redfishes	Fed.Rep. of Germany, Iceland, USSR	250-500	194	156	314	221	251	363	353	301	Fully exploited

Table 4 (cont'd)

Species	Main fishing countries (1984)	Catches ('000 t)							
		1965	1970-1974	1975-1979	1980	1981	1982	1983	1984
Freshwater and diadromous	Finland, USSR	57	56	45	51	48	47	46	40
Plaice	Denmark, Netherlands, UK	144	183	167	145	134	151	147	160
Common sole	Netherlands	26	31	23	26	25	31	31	30
Other flatfish	Denmark, France, Iceland, Netherlands, Spain	129	159	127	139	128	156	164	152
Tusk	Norway	38	32	34	49	39	41	41	41
Atlantic cod	Denmark, Iceland, Norway, Poland, USSR	1,300	1,831	1,714	1,613	1,729	1,552	1,373	1,362
Lings	France, Norway, Iceland	60	68	73	93	80	81	84	84
Haddock	Denmark, Iceland Norway, UK	499	601	385	296	334	356	314	261
Saithe (Pollock)	France, Iceland, Norway	370	638	537	377	421	457	443	493
Polar cod	USSR	-	193	18	-	9	90	37	6
Norway pout	Denmark, Norway	77	523	540	581	346	533	548	491
Blue whiting (Poutassou)	Denmark, Norway, USSR	18	41	407	1,106	888	527	523	598
Whiting	Denmark, France, UK	183	204	218	190	192	179	163	162
European hake	France, Spain	123	97	76	64	63	59	66	78
Other gadoids	France, Spain, USSR	50	39	52	63	49	51	54	46
Sandeels	Denmark, Norway, UK	141	358	643	769	653	660	592	731
Atlantic redfishes	Fed. Rep. of Germany, Iceland, USSR	194	156	314	221	251	363	353	301

Table 4 (cont'd)

Species	Main fishing countries (1984)	Estimated potential ('000 t)	Catches ('000 t)							State of exploitation
			1965	1970-1974	1975-1979	1980	1981	1982	1983	1984	
Monk (Angler fish)	France, Spain	Unknown	28	35	37	54	44	52	57	59	Unknown
Other demersal fish	France, Iceland Norway, Portugal, Spain	Unknown	91	145	152	102	96	111	116	126	Unknown
Capelin	Iceland, Norway, USSR	2,000	274	1,668	2,921	2,563	2,760	1,802	2,509	2,494	Fully exploited
Atlantic horse mackerel	Netherlands, Portugal Spain	Unknown	124	279	234	137	156	187	166	178	Moderately exploited
Atlantic herring	Denmark, Finland, German Dem. Rep., Norway, Poland, Sweden, UK, USSR	2,000-2,500	3,735	1,373	784	677	737	803	976	1,038	Some stocks recovering, others fully/over exploited
European sardine (pilchard)	Portugal, Spain	400	229	161	164	213	236	220	203	219	Moderately exploited
Sprat	Denmark	500-1,000	176	402	748	604	495	449	327	247	Some fully/over exploited, others recovering
European anchovy	Spain	Unknown	130	35	47	24	12	5	17	29	Unknown
Atlantic mackerel	Ireland, Netherlands, Norway, UK	500	302	482	724	620	593	576	572	616	Fully/over exploited
Tunas	Spain	50	75	52	46	41	35	43	49	31	Fully exploited
Other pelagic fish	Portugal, Spain	Unknown	86	44	53	21	15	14	14	52	Unknown
Sharks	France, UK	Unknown	64	71	63	56	47	48	57	55	Unknown
Skates	France	Unknown	44	29	26	27	36	29	30	33	Some species depleted
Other fishes	Denmark, France, USSR	Unknown	166	217	177	100	200	238	142	178	Unknown
Total fishes			8,933	10,203	11,549	11,022	10,871	9,911	10,214	10,391	

Table 4 (cont'd)

Species	Main fishing countries (1984)	Estimated potential ('000 t)	Catches ('000 t)							State of exploitation
			1965	1970-1974	1975-1979	1980	1981	1982	1983	1984	
Crabs	France, UK	Unknown	14	25	33	34	33	33	35	38	Unknown
Norway lobster	France, UK	50	25	36	39	40	44	46	50	49	Fully exploited
Northern prawn	Iceland, Norway, USSR	25-50	20	20	33	62	56	72	103	170	Fully/over exploited
Common shrimp	Fed.Rep.of Germ., USSR	50	52	41	40	39	36	51	55	16	Fully exploited
Other crustaceans	France, UK	Unknown	21	14	76	5	4	6	7	5	Unknown
Total crustaceans			132	136	151	180	173	208	250	278	
Oysters	France	100 b/	68	68	99	108	92	86	120	115	Fully exploited
Blue mussel	Denmark, France, Netherlands, Spain	Unknown b/	236	293	289	357	367	429	402	383	Moderately exploited
Scallops	France, Iceland, UK	50	9	41	43	46	48	45	52	52	Fully exploited
Common cockle	France, Spain, UK	Unknown b/	34	30	26	27	21	15	13	16	Moderately exploited
Cephalopods	France, Norway, Portugal, Spain	1,000 b/	11	36	25	29	37	42	48	37	Virtually unexploited
Other molluscs	Fed.Rep. of Germany, France, Spain	Unknown	28	39	31	27	33	25	32	20	Unknown
Total molluscs			386	507	513	594	598	642	667	623	
Total area c/			9,590	10,879	12,230	11,799	11,646	10,762	11,131	11,292	

Note: Management measures. The management regime of this region is in a period of transition, with the establishment of entailed jurisdiction by the coastal state, and the slow development of a common fishery policy by the EEC. A variety of measures, principally catch quotas, and controls on mesh sizes and sizes of fish have been set.

a/ Values are only indicative
b/ Aquaculture important
c/ Including grooved sea squirt, starfish, and purple sea urchin

Table 5
Western Central Atlantic (Area 31)

Stock	Estimated potential ('000 t)	Main fishing countries (1983)	Catches ('000 t) 1970-74	1975-79	1980	1981	1982	1983	1984	State of Exploitation
Freshwater and diadromous fishes	500	Venezuela	10	7	8	7	9	13	14	Fully exploited
Snappers	about 100	Cuba, Brazil	21	19	19	21	21	25	23	Uneven, some stocks
Groupers		Mexico, USA, Venezuela	24	21	30	32	30	21	22	Fully exploited
Grunts	a few 100	Guyana	29	23	7	11	6	7	9	(including shrimp bycatch)
Sciaenids		USA, Venezuela	35	38	36	34	30	26	29	
Mullets	unknown	Mexico, USA	27	23	35	32	30	27	29	Uncertain [b/]
Sharks and rays	50-100	Mexico, Venezuela	8	12	14	20	20	25	28	Moderately exploited
Other demersal fishes	unknown	Mexico, Venezuela	38	38	45	59	70	42	35	(including shrimp bycatch)
Atlantic menhaden	500	USA	50	80	99	140	89	84	4	Fully exploited
Gulf menhaden	500	USA	571	636	702	553	854	924	983	Fully exploited
Sardinella	some 100	Venezuela	44	40	59	32	58	45	55	Moderatley exploited
Other clupeoids	unknown	Cuba, Venezuela	20	15	13	10	11	12	7	Moderately exploited
King and Spanish mackerels	30-50	Mexico, USA, Venezuela	21	22	24	23	27	22	19	Moderately to fully exploited
Tunas	[a/]	Cuba, Venezuela	27	35	34	43	52	71	95	Larger species Moderately exploited
Other pelagic fish	200-400	Barbados, Venezuela	21	25	22	27	25	33	30	Moderately exploited
Unidentified fishes		Mexico, USA	130	139	185	228	218	264	272	
Total fish			**1076**	**1173**	**1332**	**1272**	**1550**	**1641**	**1654**	
Crabs	50-150	Mexico, USA	34	39	46	47	50	46	53	Moderately exploited
Spiny lobsters	40	Cuba	20	22	23	22	22	24	26	Most stocks fully
Shrimps	210	Mexico, USA	170	165	178	188	166	159	183	or over-exploited
Total crustaceans			**224**	**226**	**247**	**257**	**238**	**229**	**262**	
Oysters	-	Mexico, USA	162	172	176	177	211	246	223	Large potential for culture
Cephalopods	100-1000	Mexico, Venezuela	5	7	8	9	9	12	10	Virtually unexploited
Calico scallop		USA, Venezuela	9	14	0	147	111	97	397	Moderately-fully exploited
Other molluscs			17	33	30	37	39	25	57	
Total molluscs	**300-1200**		**193**	**226**	**214**	**371**	**370**	**380**	**687**	
Others			2	1	2	2	3	2	2	
Total area			**1495**	**1626**	**1795**	**1901**	**2161**	**2252**	**2604**	

Source: Yearbooks of Fishery Statistics

a/ See Table 19

b/ Probably moderately to heavily fished if the discards by shrimp trawlers are taken into account

Table 6

Eastern Central Atlantic (CECAF - Area 34)

CECAF Sub-areas	Stock	Main fishing countries	Estimated potential ('000 t)	Catches ('000 t) a/ 1970 -74	1975 -79	1980	1981	1982	d/	State of exploitation
Total North				**2334**	**2324**	**2194**	**2023**	**1527**		
NORTH										
All sub-areas	Cephalopods			173	147	94	136	72		Overexploited
34.1.1, 34.1.3	Octopus	Japan, Spain, USSR	100-135	95	79	53	83	33		Grossly overexploited
34.1.3, 34.3.1	Cuttlefish	Japan, Senegal, Spain	30-40	31	26	22	22	15		Overexploited
34.1.1, 34.1.3	Squid	Korea Rep., Spain	20-40	23	15	11	12	10		Overexploited
34.1.1, 34.1.3	European sardine	Morocco, Spain, USSR	1000 (variable)	392	630	495	521	337		Possibly fully exploited
34.1.3, 34.3.1	Sardinellas	Bermuda, Poland, Senegal, USSR	600 (variable)	169	204	212	125	138		Intensively exploited, locally overfished
34.3.1	Bonga	Gambia, Senegal	?	27	27	17	22	10		Unknown
34.1.3, 34.3.1	Horse mackerels	Germany, D.R., Romania, Senegal, USSR	400 (variable)	301	324	415	342	310		Possibly fully exploited (decreasing recruitment)
34.1.3, 34.3.1	Mackerels	Romania, USSR	100	87	82	69	91	92		Overexploited
34.1.3, 34.3.1	Hakes	Spain, USSR	?	41	39	29	16	9		Assessments unreliable large variability
34.1.1	Hakes	Morocco, Spain	6-12	10	10	9	6	2		Grossly overexploited
34.1.3, 34.3.1	Sea breams	Greece, Senegal, USSR	150(?)	91	60	22	28	37		Probably overexploited

Table 6 (continued)

CECAF Sub-areas	Stock	Main fishing countries	Estimated potential ('000 t)	1970 -74	Catches ('000 t) a/ 1975 -79	1980	1981	1982	d/	State of exploitation
Total South				**540**	**655**	**725**	**778**	**783**		
SOUTH										
34.3.3/34.3.4/ 34.3.5/34.3.6	All prawn and shrimp	Cameroon, Ivory Coast, Nigeria, Spain	15	4	6	10	7	7		Close to full exploitation
All sub-areas	Demersal c/		68-85	158	208	256	260	240		Fully exploited
34.3.4	Sardinellas	Ghana, Ivory Coast	60 (variable)	57	53	44	39	44		Round sardinella recovering; fully exploited
34.3.6	Sardinellas	Congo, Zaire	Unknown	6	6	6	10	12		Probably moderately exploited
All sub-areas	Bonga	Gabon, Ivory Coast, Sierra Leone	Unknown	44	40	64	69	71		Intensively exploited; stock collapse in Ivory Coast
Total Oceanic				**56**	**63**	**139**	**33**	**21**		
OCEANIC 34.1.2/34.2.0/ 34.3.2/34.4.1/ 34.4.2										
TUNA 34.0 b/		France, Japan, Korea, Spain, USA		200	249	281	300	305		Moderately to heavily exploited
UNKNOWN AREA 34.9.0					471	99	82	369		
Total CECAF area a/					**3132**	**3385**	**3439**	**3216**	(1983) **3192**	(1984) **2609**

a/ Source: CECAF Statistical Bulletins; 1983, 1984 data not available, regional total from Yearbook of Fishery Statistics
b/ Catches in all sub-areas; see also Table 19
c/ Probably over-estimated, due to Nigerian reporting
d/ Data for 1983/84 not yet available

Table 7

Mediterranean and Black Sea (Area 37)

Sector a/	Species Groups	Coastal countries	Estimated stocks	Potentials ('000 t) b/	Catches ('000 t) c/ 1970 -74	1975 -79	1980	1981	1982	1983	1984	
Balearic	Demersal	Algeria	Trawl only	80	32.4	37.0	46.7	38.2	42.5	44.1	41.9	Demersal stocks
37.1	Coastal pel.	Morocco		Unknown	93.2	132.4	133.6	152.7	163.3	161.8	165.8	
	Miscel.d/	Spain			10.3	22.6	22.7	38.6	34.9	26.7	25.7	Fully exploited to grossly overfished
Gulf Lions	Demersal		Finfish (shelf)	10	9.1	7.2	8.0	8.7	10.0	9.7	7.9	in the Northern
37.2	Coastal pel.	France	Sardine	20-25	19.7	18.5	22.4	29.9	29.3	24.8	21.2	Mediterranean coasts
	Miscel.d/				9.4	3.3	1.6	1.9	1.8	2.4	3.0	Moderately to fully exploited on the
Sardinia	Demersal	France	Trawl only	60	43.6	22.8	19.2	22.1	22.3	26.5	27.6	Southern Mediterra-
37.3	Coastal pel.	Italy (W)		100	58.8	39.1	28.5	43.2	35.9	43.5	33.4	nean shores.
	Miscel.d/	Tunisia (N)			15.1	12.4	12.5	11.9	11.7	14.1	15.3	
Adriatic	Demersal	Italy (E)	Trawl only	80-100	32.6	18.4	18.0	15.8	27.1	16.2	16.0	
37.4	Coastal pel.	Yugoslavia		few 100s	80.2	91.7	121.6	138.6	124.5	21.4	105.7	Coastal pelagic stocks
	Miscel.d/				30.6	37.2	27.3	29.5	20.8	40.9	48.3	
Ionian	Demersal	Albania,	Trawl only	85	37.8	42.2	38.4	39.8	30.1	54.5	74.0	Moderately exploited except few sectore
	coastal pel.	Italy (S), Libya		Unknown	32.2	43.8	50.0	46.0	54.2	46.5	45.9	fully exploited.
	Miscel.d/	Malta, Tunisia(E)			16.3	35.2	35.1	38.4	56.8	35.7	38.1	Changes in species composition in area
Aegean	Demersal			Unknown	17.5	22.2	26.2	25.1	27.6	28.3	28.9	37.1. Changes in
37.6	Coastal pel.	Greece (E)		Unknown	23.2	35.8	46.1	43.3	43.8	45.2	50.4	biomass in the
	Miscel.d/	Turkey (W)			7.5	10.2	12.9	12.3	14.4	7.9	8.0	Adriatic.
Levant	Demersal	Cyprus, Egypt	Finfish	25(?)	10.0	12.0	13.0	15.3	11.5	13.2	11.9	
37.7	Coastal pel.	Israel, Lebanon		Unknown	9.1	9.0	12.0	14.7	12.4	14.5	13.7	
	Miscel.d/	Syria, Turkey			4.1	3.1	4.9	5.2	3.3	4.0	3.6	
Whole	Demersal			400-500	183.0	161.8	169.5	165.0	171.1	192.7	208.4	
Mediter-	Coastal pel.			500(?)	316.4	370.3	414.2	468.4	463.4	457.9	436.2	
ranean	Miscel.d/				93.3	124.0	117.0	137.8	143.7	113.6	143.6	
Total Mediterranean				**1000**	**592.7**	**656.1**	**700.7**	**771.2**	**778.2**	**764.1**	**788.2**	
Black Sea	Demersal	Bulgaria, Romania		few 100s	27.7	31.8	36.3	32.4	44.5	52.3	46.0	Demersal stocks
37.8	Coastal pel.	Turkey		500	335.0	369.3	639.0	637.0	690.9	680.6	766.2	
	Miscel.d/	USSR			57.6	73.5	85.4	60.2	140.9	144.0	91.7	Fully or over- (turbot) exploited.
Area 37.0	Tunas				22.9	25.9	37.7	44.5	50.9	59.1	42.0	
Totals	Demersal				210.7	193.6	205.8	197.4	215.6	245.0	254.4	Pelagic stocks
Area 37	Coastal pel.				651.4	739.6	1053.2	1105.4	1154.3	1138.4	1202.4	
	Miscel.				150.9	197.5	202.4	198.0	284.6	257.6	235.3	Probably moderately
	Tunas				22.9	25.9	37.7	44.5	50.9	59.1	42.0	to fully exploited
Total area c/				**1500**	**1115.1**	**1292.7**	**1647.1**	**1698.3**	**1872.2**	**1898.0**	**1918.8**	

a/ GFCM statistical divisions (boundaries given in GFCM Statistical Bulletins

b/ Potenial and catch figures do not generally correspond accurately: for instance, part of demersal catches are reported under miscellaneous; potentials may refer to stocks exploited by trawl only, whereas demersal landings include catches by all gear, etc. For this reason, for most areas, the catches reported for demersal are much lower than the potential estimate although most stocks are fully or overexploited.
Sources for potential estimates: Reports of the 6th and 7th Sessions of the GFCM Working Party on Resources Evaluation and Fishery Statistics.

c/ Source for catch statistics by sectors: GFCM Statistical Bulletin.

d/ Miscellaneous: diadromous plus marine fisheries n.e.i.

Table 8

Southwest Atlantic (Area 41)

Stock	Principal countries	Estimated potential ('000 t)	Catches ('000 t) 1971 -74	1975 -79	1980	1981	1982	1983	1984	State of exploitation
Argentine hake	Argentina, Brazil, Uruguay	600	153	316	355	327	360	348	262	Moderately exploited
Southern blue whiting	Poland, USSR		0	11	78	70	137	258	113	Probably heavily fully exploited
Atlantic croaker	Argentina, Brazil, Uruguay	-	56	84	80	79	83	85	68	Moderately to fully exploited
Weakfishes	Argentina, Brazil, Uruguay	-	42	58	70	81	80	76	70	Moderately to fully exploited
Sardinella	Brazil	200	164	165	229	177	197	259	266	Fully exploited
Anchoita	Argentina, Uruguay	1000	32	20	11	15	10	28	26	Virtually unexploited
Red shrimp	Argentina	not known	0	0	1	3	8	19	23	Probably fully exploited
Other prawns and shrimps	Brazil	60	50	54	48	46	54	51	65	Most stocks fully to heavily exploited
Squids	Argentina, Brazil, Japan, Poland, Uruguay	few 100s	4	43	31	54	208	205	258	Some stocks probably fully exploited
Sprats	Argentina	few 100s	-	-	-	-	-	-	-	Unexploited
Other demersal Patagonian Shelf	Argentina, Germany, Japan, Poland, UK, USSR	500-1000	0	5	15	5	5	4	22	Lightly to moderately exploited
Total			**846**	**1092**	**1272**	**1253**	**1515**	**1682**	**1575**	

Table 9

Southeast Atlantic (Area 47)

Stocks Species	ICSEAF divisions	Major fishing countries (1984)	Estimated potential ('000 t)	Catches ('000 t) a/b/ 1970 -74	1975 -79	1980	1981	1982	1983	1984	State of exploitation
Hakes	1.1+1.2	USSR	10(?)	3	11	3	5	2	0	0	Probably moderate
	1.3+1.4	Spain, USSR	340	414	284	103	101	194	222	229	Recently overexploited
	1.5	Spain, Sth. Africa, Portugal	210	231	158	70	116	128	126	142	Recently overexploited possibly some recovery
	1.6	Sth. Africa	160	164	104	102	97	83	74	83	Recently overexploited
	2.1+2.2	Sth. Africa	65	55	53	48	35	47	41	43	Biomass coming back to the level of maximum average yield
Kingklip	Mainly 1.4+1.5+1.6 +2.1+2.2	Sth. Africa, Spain	20(?)	12	12	11	10	7	9	10	Slightly overexploited
Large-eyed dentex	1.2+1.3+1.4	Bulgaria, Romania	Few 10s(?)	15	26	0	0	0	1	0	Fully exploited
Panga	2.1+2.2	Japan, Sth. Africa	8	8	6	2	2	2	2	2	Fully exploited
Sardinella	1.1+1.2+1.3	Angola, USSR	Few 100s(?)	92	125	205	160	181	154	180	Moderately exploited
Cunene	1.1+1.2	Angola, USSR		...	30	51	47	47	58	9	
Horse mackerel	1.3+1.4+1.5	Angola, USSR	500* or more with recent high recruitments	159	180	297	95	58	52	46	Intensively exploited
Cape horse mackerel	1.3+1.4+1.5	Bulgaria, Poland, Romania, Sth. Africa, USSR		161	386	283	564	647	536	547	
	1.6+2.1+2.2	Japan, Sth. Africa	Varying, 100(?)	32	52	17	17	16	38	38	Moderately to highly exploited

Table 9 (continued)

Stocks Species	ICSEAF divisions	Major fishing countries (1984)	Estimated potential ('000 t)	Catches ('000 t) a/b/ 1970 -74	1975 -79	1980	1981	1982	1983	1984	State of exploitation
Pilchard	1.3+1.4+1.5	Poland, USSR, Angola	About 600 before collapse sustainable yield few 100s at present	462	280	12	53	54	50	72	Severely depleted Sharp decrease in biomass
	1.6	Sth. Africa	Varying* around 100	68	91	50	46	35	61	29	Depleted
Anchovy	1.3+1.4+1.5	Sth. Africa	at least 250	211	212	190	199	83	184	14	Fully exploited
	1.6	Sth. Africa	150-350	233	244	315	292	306	240	272	Fully exploited
Chub mackerel	1.1+1.2+ 1.3+1.4	Spain, USSR	Unknown	3	78	12	48	34	50	27	Probably intensively exploited
	1.6	Sth. Africa	Varying* around 50(?)	58	23	2	3	4	5	2	Fully exploited or depleted
Total area b/				**2751**	**2751**	**2137**	**2355**	**2317**	**2311**	**2106**	

Source: 1965-76 information provided in FAO Fish. Circ. 710 updated on the basis of reports of December 1979 ICSEAF meeting
* Recruitment and consequently biomass and potential have considerably fluctuated since the outset of the fishery

a/ 1977-79 data: ICSEAF Bulletins
b/ Total production figures for the whole area: 1965-79 FAO Yearbook of Fishery Statistics Vol. 48: 1981-84 ICSEAF Bulletins

Table 10

Western Indian Ocean (Area 51)

Stock	Main fishing countries	Catches ('000 t) 1980	1981	1982	1983	1984	State of exploitation
Shad (Hilsa)	India, Pakistan	12	10	12	12	16	
Giant sea perch	Pakistan	1	2	3	3	3	
Flat fishes	India	11	10	17	17	22	
Bombay duck	India	115	97	81	90	115	
Sea catfishes	India, Pakistan, USSR	61	54	49	51	53	
Lizard fishes	India, Egypt	11	10	9	9	5	
Pike congers	India, Pakistan	18	11	10	10	12	
Groupers	Italy ('80), Mauritius, UAE	5	8	12	13	14	Mostly moderately to fairly heavily exploited
False trevally	India	4	4	9	6	5	
Snappers	Pakistan, island states	3	8	7	7	8	
Ponyfishes	India	9	11	16	19	13	
Grunts	Pakistan, Gulfs	2	5	7	6	7	
Emperors (Lethrinids)	Tanzania, Mauritius, UAE	11	13	14	19	19	
Croakers, drums	India, Pakistan	114	112	109	83	129	
Goatfishes	India	6	5	7	5	23	
Porgies, seabreams	Korea, USSR, Pakistan	8	10	13	13	13	
Threadfins	India, Pakistan	3	4	6	6	6	
Other identified demersal percomorphs		14	11	12	18	15	
Demersal Percomorphs n.e.i.		79	86	88	92	82	
Black pomfret	Pakistan	3	3	4	4	4	
Butter fishes	India	39	36	30	41	33	
Carangids	Pakistan, Sri Lanka, India, UAE, USSR	43	47	59	64	68	
Sardinellas	India, Pakistan, UAE, Yemen, Dem.	227	346	271	260	307	Stocks of small pelagic fish
Anchovies	India, UAE	40	37	51	94	94	Lightly to moderately exploited
Wolfherrings	India, Pakistan	19	18	19	21	23	
Mixed clupeoids	Sri Lanka, India	88	85	89	98	105	
Other identified pelagic percomorphs		30	36	37	43	47	
Pelagic percomorphs n.e.i.		109	107	113	136	129	
Hairtails	India, Pakistan	41	36	46	40	46	
Mackerel (Rastrelliger)	India, Sri Lanka, USSR, UAE	53	59	38	37	53	
Sharks, rays	India, Pakistan, Sri Lanka	113	115	119	121	123	
Kingfish or seerfish	India, Pakistan, Sri Lanka	33	33	40	48	50	
Skipjack	Maldives, Sri Lanka, France (1983)	37	36	36	50	83	
Yellowfin	Sri Lanka, Maldives, Japan, Korea	13	29	38	47	70	
Longtail tuna	Iran, UAE	1	3	7	9	9	
Little tuna	Pakistan	8	12	12	13	13	
Tuna-like fishes	India, Sri Lanka	32	28	33	32	31	
Big-eye	Korea, Japan	16	22	28	30	21	
Albacore	Not identified	4	3	14	14	14	
Southern bluefin	Japan	2	6	5	8	3	
Marlins	Japan, Korea, Not ident. Pakistan	4	5	5	5	5	
Unidentified fish		318	227	224	227	296	
Total fish		**1770**	**1800**	**1799**	**1920**	**2187**	

Table 10 (continued)

Stock countries	Main fishing	Catches ('000 t) 1980	1981	1982	1983	1984	State of exploitation
Shrimps	India, Pakistan, Mozambique, Madagascar, Gulf States	261	188	227	207	217	Mostly fully exploited or overfished
Lobsters	Somalia, Pakistan, Reunion	5	4	4	5	5	
Mixed crustaceans	India, Saudi Arabia, Sri Lanka	25	22	26	26	20	
Crabs		2	1	1	1	1	
Total crustaceans		**293**	**215**	**258**	**239**	**243**	
Cuttle fish	YAR, Japan, USSR	16	4	3	2	7	
Other cephalopods and bivalves	India, Japan, Italy	13	10	11	10	17	
Total molluscs		**29**	**14**	**14**	**12**	**24**	
Total area		**2092**	**2029**	**2071**	**2172**	**2454**	

Table 11

Eastern Indian Ocean (Area 57)

Species group	Main fishing countries	Catches ('000 t) 1980	1981	1982	1983	1984
Shad (Hilsa)	India (Bangladesh, Burma not included)	18	14	13	19	74
Giant seaperch	Indonesia, Australia	3	1	1	2	2
Flatfishes	India, Thailand	3	5	3	2	3
Sea catfishes	India	25	24	20	26	35
Lizard fish	India	3	4	4	5	5
False trevally	India	4	4	5	5	3
Sillago	Australia	2	2	2	2	2
Ruffs	Australia	4	3	4	5	6
Snappers	Indonesia	3	3	2	3	3
Threadfin breams	Thailand, Indonesia	5	5	4	3	3
Ponyfishes	India, Indonesia	36	36	38	43	39
Croakers	India, Thailand	34	24	30	32	35
Goatfishes	India, Indonesia	3	3	4	5	3
Halfbeaks and needlefish	India, Australia, Indonesia	9	7	7	7	10
Barracudas	India, Thailand	4	5	5	5	5
Threadfins	India	4	5	5	5	5
Carangids	India, Indonesia, Thailand	27	32	37	44	52
Butterfishes	India	14	12	12	14	17
Sardinella, sardines	India, Indonesia	76	71	85	96	93
Anchovies	India, Indonesia	47	50	53	55	47
Other Clupeoids	India, Australia	11	16	10	10	19
Wolfherrings	India, Thailand	9	10	6	7	10
Kingfish, seerfishes	India, Indonesia, Thailand	20	18	18	20	24
Hairtails	India, Indonesia	23	38	27	37	31
Mackerels (Rastrelliger)	India, Indonesia, Thailand	34	31	34	43	50
Sharks and rays	India, Indonesia, Australia	42	47	42	48	50
Skipjack	Indonesia	8	7	12	13	14
Yellowfin	Indonesia, Japan	13	9	7	9	10
Bigeye	Japan, Korea Rep., not identified	17	12	8	14	13
Albacore	Not identified	7	6	5	5	5
Southern bluefin	Australia, Japan	22	20	24	29	27
Marlins, billfishes swordfish	Japan, Korea Rep., not identified	4	4	2	2	3

Table 11 (continued)

Species group	Main fishing countries	Catches ('000 t) 1980	1981	1982	1983	1984
Tuna-like fish	Indonesia, India, Thailand	28	24	43	46	46
Other, identified fish	Australia, Indonesia, Thailand, India	36	39	36	46	56
Unidentified fish	Bangladesh, Burma, Thailand, India	737	796	779	791	778
Total fishes		**1335**	**1387**	**1387**	**1498**	**1578**
Swim and mud crabs	Thailand	8	7	6	5	5
Lobsters	Australia	14	16	16	18	16
Penaeid shrimps	India, Thailand,	11	15	15	15	16
Sergestid shrimps	Australia, Indonesia	3	3	3	3	3
Other crustacea	India	55	48	51	59	69
Total crustaceans		**91**	**89**	**91**	**100**	**109**
Abalones	Australia	6	6	7	6	8
Oysters and mussels	Australia, Thailand	2	3	5	5	5
Scallops	Australia	6	6	22	27	27
Cockles and clams	Thailand	8	2	4	4	4
Cuttlefish and squids	Thailand	14	9	9	10	10
Other mulluscs	India, Thailand	1	4	2	3	5
Total molluscs		**37**	**30**	**49**	**55**	**59**
Jelly fishes	Thailand	0	19	74	126	126
Total area		**1463**	**1525**	**1601**	**1779**	**1872**

Source: FAO Yearbooks of Fisheries Statistics

Table 12

Northwest Pacific (Area 61)

Stock	Main fishing countries (1984)	Estimated potential a/ ('000 t)	Catches ('000 t) 1970 -74	1975 -79	1980	1981	1982	1983	1984	State of exploitation
Salmon	Japan, USSR	300-350	186	230	222	251	197	289	235	Somewhat depleted but recovering
Alaska pollack	Japan, Korea Rep. USSR	3000-5000	3014	3564	3193	3131	3484	3667	4614	Fully exploited
Largehead hairtail	China, Korea Rep.	650-700	673	571	657	703	676	661	650	Fully exploited
Other demersal	China, Japan, Korea Rep., USSR	2800-2900	1683	2068	1945	1850	1813	1575	1967	Most stocks fully exploited or overfished
Pacific saury	Japan		283	334	238	203	241	252	242	
Japanese jack mackerel	Japan		192	116	57	72	120	146	147	
Pacific herring	China, Japan, USSR	5800-6500	465	248	129	131	137	163	167	Stocks fished close to maximum, taking into account fishing and natural fluctuations, by strong management measures
Japanese sardine	Japan, Korea Rep., USSR		157	1433	2595	3613	3966	4465	5156	
Japanese anchovy	Japan, Korea Rep.		441	356	320	345	360	339	379	
Chub mackerel	China, Japan, Korea Rep., USSR		1554	1808	1679	1358	1177	1224	1331	
Tunas, billfishes b/	Japan, China c/	280-380	285	315	354	263	291	310	401	Most stocks fully exploited
Other pelagic	Japan		387	490	526	498	515	655	756	
Japanese flying squid	Japan, Korea Rep.	300-400	425	285	379	259	248	231	220	Fully exploited
Marine fishes n.e.i.	China, Japan, Korea Rep.	3800-3900 d/	2818	3488	3636	3947	4072	4137	4238	
Total area		19800-21600 e/	12546	17951	18759	19428	20403	21252	23730	Nearly fully exploited

a/ Generally on a conservative basis
b/ Includes skipjack tuna, larger tunas, smaller tunas and billfishes
c/ Taiwan, Province of China
d/ Current level
e/ Includes, in addition to the above (1) other cephalopods (650-850); (2) prawn and shrimps (400-600), and (3) others (1750, current level)

Table 13

Northeast Pacific (Area 67)

Stock	Main fishing countries (1983)	Estimated potential ('000 t)	Catches ('000 t) 1970 -74	1975 -79	1980	1981	1982	1983	1984	State of exploitation
Salmons	Canada, U.S.A.	250	197	219	330	371	339	364	363	Fully exploited
Pacific halibut	Canada, U.S.A.	38	25	14	13	15	17	23	26	Depleted, recovering
Yellowfin sole	Japan, U.S.A.	150-180	56	76	60	77	81	87	126	Moderately exploited
Other flatfishes	Canada, Japan, Korea Rep., U.S.A.	210-350	172	112	107	126	113	111	131	Moderately exploited
Pacific cod	Canada, Japan, Korea Rep., U.S.A.	350-380	70	62	77	102	99	130	150	Moderately exploited
Alaska pollack	Japan, Korea Rep., U.S.A.	1150-1600	1063	888	827	1046	994	1191	1373	Fully exploited
North Pacific hake	Poland, U.S.A.	210	169	163	57	120	94	93	113	Moderately exploited
Pacific ocean perch	Canada, Japan, U.S.A.	210	109	41	31	29	23	24	23	Depleted
Sable fish	Canada, Japan, U.S.A.	50-60	47	28	18	22	28	26	27	Moderately exploited
Pacific herring	Canada, U.S.A.	several 100s	114	101	66	81	77	90	77	Local stocks in different states
King crabs	U.S.A.	30-50	40	53	84	40	17	12	8	Depleted
Pacific snow crabs	U.S.A.	50-80	31	52	62	50	31	28	22	Fully to heavily exploited
Pacific ocean shrimps	U.S.A.	Unknown	58	67	44	30	20	9	9	Fully to heavily exploited
Total area			2392	2058	1975	2373	2160	2413	2687	

Table 14

Western Central Pacific (Area 71)

Stock	Main fishing countries (1983)	Catches ('000 t) 1970 -74	1975 -79	1980	1981	1982	1983	1984	State of exploitation
Demersal fish	Major Asian countries c/	491	622	639	623	641	698	759	Inshore stocks heavily exploited
Coastal small pelagic fish									
Mackerels		223	237	274	295	300	340	330	Scads and mackerels
Round scads	Major Asian countries c/	264	345	245	274	311	313	284	approaching maximum,
Sardines		231	411	418	477	444	465	364	sardines, anchovies
Anchovies		148	174	216	214	225	243	239	moderately exploited
Total		866	1167	1153	1620	1280	1361	1218	
Coastal larger pelagic fish									
King/Spanish mackerels		53	66	72	91	87	91	88	
Smaller tunas a/	Major Asian countries c/	94	228	208	229	260	274	275	Moderately exploited
Total		147	294	280	320	347	365	363	
Skipjack tuna	Indonesia and Philippines	42	70	75	85	101	121	117	Approaching maximum
	Major Oceanic countries d/	32	55	65	61	33	42	51	level
	Non-coastal countries e/	103	156	163	154	177	224	338	
Total		177	281	303	300	311	387	507	
Yellowfin tuna	Indonesia and Philippines	48	62	66	78	76	84	83	
	Major Oceanic countries d/	3	7	6	9	6	7	9	(see tuna review)
	Non-coastal countries f/	30	57	86	94	90	88	105	
Total		81	126	159	181	173	180	198	
Penaeid shrimps	Major Asian countries c/	179	206	232	236	259	256	244	Most stocks fully or
other shrimps and prawns	Australia	99	159	166	220	180	178	168	heavily exploited
Total		278	365	398	456	439	434	412	
Cephalopods b/	Major Asian countries	95	136	132	140	165	191	182	Only slightly to moderately exploited
Total area		4718	5651	5487	5761	5841	6305	6423	

a/ Ballet and frigate tunas, kawakawa and longtail tuna. Nominal statistics are incomplete, only a few countries separated these species
b/ Squids, cuttlefish and octopuses
c/ Indonesia, Malaysia, Philippines and Thailand
d/ Fiji, Kiribati and Solomon Islands
e/ Japan, Korea Rep. and U.S.A.
f/ Japan, Korea Rep., U.S.A. and Tawain, Province of China

Table 15

Eastern Central Pacific (Area 77)

Stock	Main fishing countries (1983)	Estimated potential ('000 t)	Catches ('000 t) 1970 -74	1975 -79	1980	1981	1982	1983	1984	State of exploitation
Demersal fishes	Mexico, USA	1000-2000	81	70	79	122	123	69	77	Lightly exploited
Chub mackerel	Ecuador, Mexico, USA	few 100s	68	366	605	701	282	131	351	Moderately exploited
Pacific jack mackerel	USA	100-500	19	27	20	15	26	19	11	Lightly exploited
Californian pilchard (=sardine)	Mexico	a/	58	143	328	344	433	381	278	a/
North Pacific anchovy	Mexico	500-1000	92	238	374	424	365	102	135	Lightly exploited
Central Pacific anchoveta	Colombia, Ecuador	few 100s	38	107	172	110	77	160	192	Moderately to fully exploited
Pacific thread herring	Ecuador, Panama	few 100s	17	19	23	27	60	40	106	Moderately to fully exploited
Other coastal pelagic fishes	Ecuador, Mexico, USA	500?	8	12	20	30	212	107	310	Lightly exploited
Skipjack tuna	Mexico, USA	250	61	121	134	147	124	59	78	Moderately exploited
Northern bluefin tuna	Mexico, USA		9	8	3	2	3	1	1	Moderately exploited
Albacore	Japan, USA, Other nei	100-200	15	20	18	23	22	24	31	Moderately exploited
Bigeye tuna	Japan	b/	42	69	68	55	63	65	58	Moderately exploited
Yellowfin tuna	Mexico, USA	200-250	165	197	152	167	138	112	150	Fully exploited
Other oceanic fish	Ecuador, Japan, USA	100-500?	28	42	52	57	51	41	43	Lightly exploited
Unident. fishes	Ecuador, Mexico		153	125	203	303	167	63	120	
Total fishes c/			**868**	**1567**	**2251**	**2527**	**2146**	**1374**	**1941**	
Dungeness and Pacific rock crabs	USA	500?	2	1	0	1	0	0	0	Unexploited
Shrimps	Ecuador, Mexico, Panama	80	78	71	88	92	113	116	115	Fully exploited
Total crustaceans		**600**	**84**	**83**	**103**	**115**	**122**	**122**	**121**	
Squids	Mexico, USA	500-100?	11	14	31	32	20	16	18	Lightly exploited
Total molluscs			**31**	**36**	**64**	**67**	**51**	**38**	**38**	
Others			6	13	3	3	11	9	8	
Total area			**989**	**1699**	**2421**	**2712**	**2335**	**1543**	**2108**	

a/ Potential varies - USA fishery collapsed in the 1950s
b/ See also Table 19
c/ Includes freshwater fishes

Table 16

Southwest Pacific (Area 81)

Stock	Main fishing countries (1983)	Estimated potential ('000 t)	Catches ('000 t) a/ 1970 -74	1975 -79	1980	1981	1982	1983	1984	State of exploitation
Demersal	Japan, New Zealand, USSR	appr. 500	85	156	149	169	170	209	304	Moderately to heavily exploited in some areas
Poutassou	USSR	Not available	23	19	8	7	18	20	9	Unknown
Grenadier	USSR		2	48	13	14	16	24	26	
Small pelagic	Australia, Japan, New Zealand	appr. 1000	26	38	22	27	32	39	46	Probably mostly to moderately exploited
Jack mackerels	Japan, New Zealand	Not available	14	13	6	12	15	24	31	Unknown
Rock lobsters	New Zealand	6	5	4	5	5	5	5	6	Fully exploited
Oysters	Australia, New Zealand	b/	19	20	17	18	19	19	18	Probably fully exploited
Cephalopods	Japan, USSR	Not available	8	35	80	63	71	70	95	Lightly exploited
Total area			**254**	**374**	**385**	**398**	**403**	**435**	**454**	

a/ Main Australian fishery in Tasmania/South Australia now considered under Indian Ocean
b/ Potential harvest dependent on intensity of aquaculture

Table 17

Southeast Pacific (Area 87)

Stock	Main fishing countries (1983)	Estimated potential ('000 t)	Catches ('000 t) 1970 -74	1975 -79	1980	1981	1982	1983	1984	State of exploitation
Chilean hake	Chile, Peru	100-200	139	194	191	103	53	30	44	Fully exploited
Chilean jack mackerel	Chile, Peru, USSR	over 2000(?)	173	776	1280	1740	2204	1654	2330	Moderately exploited
Chilean pilchard (=sardine)	Chile, Peru	3000(?)	103	1512	3253	2804	3290	3997	5025	Fully exploited
Anchoveta (=Peruvian anchovy)	Chile, Peru	Unknown[a/]	6959	2251	823	1550	1826	126	88	Depleted
Squids	Chile, Peru	Some 100s	0.6	0.5	0.3	1.1	2.8	2.6	2.5	Virtually unexploited
Sauries	Chile, Peru	Some 100s	-	-	-	-	-	-	-	Unexploited
Total area			**7939**	**5314**	**6231**	**6835**	**7918**	**6278**	**8229**	

a/ Potential used to be 9 000-11 000 tons under conditions occurring in the 1960s

Table 18

Southern Oceans (Areas 48, 58 and 88)

Stock	Main fishing countries (1983)	Estimated potential ('000t)	Catches ('000 t) 1969/70c/ -73/74	1974/75c/ -78/79	1979c/ -80	1980c/ -81	1981c/ -82	1982c/ -83	1983c/ -84	1984c/ -85	State of exploitation
N. Rossii											
Area 48 a)	Poland, USSR		89	6	45	2	1	1	4	2	Over-exploited
Area 58 b)	USSR		42	13	2	1	10	2	1	2	Over-exploited
N. squamifrons											
Area 48 a)	USSR		0	2	0	1	1	0	0	1	Unknown
Area 58 b)	USSR		20	11	16	9	5	2	4	7	Heavily exploited
N. guentheri											
Area 48 a)	USSR		0	3	7	38	31	5	11	12	Unknown
N. gibberifrons											
Area 48 a)	Poland, USSR		0	8	10	8	3	0	12	8	Heavily exploited
C. gunnari											
Area 48 a)	Poland, USSR		3	62	14	33	47	136	84	17	Heavily exploited
Area 58 b)	USSR, France		16	28	2	1	16	26	7	9	Heavily exploited
Other fishes											
Area 48 a)	Germany D.R., Poland, USSR		0	15	20	23	9	25	9	8	
Area 58 b)	USSR		3	1	0	0	1	0	1	8	
Area 88			0	0	0	2	0	0	0	0	
Total fishes											
Area 48			**92**	**96**	**96**	**105**	**89**	**167**	**120**	**48**	
Area 58			**78**	**52**	**20**	**11**	**31**	**30**	**13**	**26**	
Area 88			**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	
Krill											
Area 48	Chile, Japan, USSR		4	92	357	289	374	139	105	181	Probably
Area 58	Japan, USSR		0	27	117	155	148	80	23	6	under-exploited
Area 88	Japan		0	1	3	4	7	11	1	5	
Total area											
Area 48			**96**	**188**	**453**	**394**	**463**	**306**	**225**	**229**	
Area 58			**78**	**79**	**137**	**166**	**179**	**110**	**36**	**32**	
Area 88			0	1	**3**	**6**	7	11	1	5	
Total Southern Oceans			**174**	**268**	**593**	**566**	**649**	**427**	**262**	**266**	

a/ Principally around South Georgia.
b/ Principally around Kerguelen.
c/ Split year fishing season: July 1 to June 30.

Table 19

Oceanic Tunas and Billfishes, Smalltunas and Seerfishes

Ocean	Species	Main Fishing Countries (1984)	Estimated Potential	Catches ('000 t) 1970 -74	1975 -79	1980	1981	1982	1983	1984	State of exploitation
Atlantic	N. Bluefin	Italy, France, Japan, Spain, USA	20-30 b/	16	23	19	19	23	23	22	Heavy
	Albacore	Taiwan (P.China), Spain, Other	70-90	76	71	61	59	72	67	54	Moderate
	Yellowfin	Spain, Venezuela, Korea, France	120-160	88	127	126	152	160	163	110	Heavy in 85
	Bigeye	Japan, Korea Rep., Portugal, Spain	50-100?	45	45	63	67	62	63	63	Heavy
	Skipjack	Spain, France, Venezuela, Ghana, Brazil	200-300?	83	91	109	129	153	139	133	Moderate
	Billfishes including swordfishes	Spain, USA, Japan, Cuba, etc.	20-50?	18	21	26	21	27	22	20	Probably heavy (i.e. blue & striped marlin)
Totai oceanic tunas & billfishes		Atlantic Ocean		326	378	404	447	497	477	402	
Smalltunas & seerfishes		Turkey, Mexico, Ghana, Senegal, other				111	110	123	122	120	Prob. moderate
Indian	S.Bluefin e/	Japan, Australia,	35-40	47	38	45	45	43	43	40f/	Heavy
	Albacore	Taiwan (P. China), Korea Rep., Japan	15-20 c/d/	17	12	12	13	21	17	16f/	moderate
	Yellowfin	Korea Rep., Maldives, Sri Lanka, France	100-150	36	40	35	36	48	58	97	Probably heavy in the west
	Bigeye	Korea Rep., Taiwan (P. China), Japan	30-60?	20	36	33	33	42	33	40	Moderate to fully exploited
	Skipjack	Maldives, Sri Lanka, Indonesia	200-400	39	33	46	46	51	61	104	Moderate
	Billfishes	Korea Rep., Japan, Taiwan (P. China)	10?	7	6	10	9	11	6	6f/	Moderate
Total oceanic tunas & billfishes		Indian Ocean		166	165	181	182	216	218	303	
Smalltunas and seerfishes		India, Sri Lanka, Pakistan, UAE, Yemen Dem., Iran	200-300?	55	97	119	119	153	163	160	Prob. moderate
Pacific	N. Bluefin	Japan, USA	d/	20	19	17	27	26	16	8	Heavy
	Albacore	Japan, USA, Mexico	d/	130	122	108	113	107	86	100	Near fully exploited
	Yellowfin	SA, Japan, Philippines, Mexico, Venezuela	d/	291	365	387	418	367	392	380	Heavy
	Bigeye	Japan, Korea Rep., Taiwan (P. China)	120-130	82	123	122	96	108	109	102	Moderate to fully exploited
	Skipjack	Japan, USA, Philippines, Mexico, Indonesia, Solomon	1500?	391	556	636	543	567	732	820	Moderate
	Billfishes	Japan, Other	60?	44	44	48	45	47	47	39	Pos.heavy (i.e. blue marlin)
Total oceanic tunas and billfishes		Pacific Ocean			1229	1318	1242	1222	1382	1449	
Smalltunas and seerfishes		Indonesia, Philippines, Japan, Thailand, Korea				471	512	542	575	699	Heavy in the SE asia area
Total all oceans oceanic Tunas and billfishes					1772	1903	1871	1935	2077	2153	
Total all oceans small Tunas and seerfishes						701	741	818	860	979	
Total all Tunas and Tunalike fishes						2604	2612	2753	2937	3132	

a/ Atlantic data from ICCAT Bulletins. Indian Ocean and Pacific data from FAO Yearbook of Fisheries Statistics.
b/ Depends on strength of recruitment, which appears highly variable.
c/ Longline stocks are heavilly exploited. Figures of potential are for this fishery only.
d/ No ocean-wide estimate of potential covering all sizes and methods of capture available.
e/ Includes S. Bluefin caught in the Pacific and Atlantic.
f/ Provisional figures.